

**PRELIMINARY**

# TC-651

*General Export Model*



Set using ISO screws

## SPECIFICATIONS

**Power Requirements:** AC 100V, 110V, 117V, 120V, 125V, 220V and 240V  
(Changeable by using the voltage selector)  
50/60 Hz, 85W

**Track System:** Four-track stereo and mono

**Reel Size:** 7" maximum

**Tape Speed:** 7½ ips and 3¾ ips  
(19 cm/s and 9.5 cm/s)

Recording Time: (with 1,800 ft. tape)	Tape speed	4-track stereo	4-track mono
	7½ ips (19 cm/s)	1.5 hrs	3 hrs
	3¾ ips (9.5 cm/s)	3 hrs	6 hrs

**Frequency Response:** 20 ~ 25,000 Hz at 7½ ips (19 cm/s)  
30 ~ 18,000 Hz at 3¾ ips (9.5 cm/s)

**Signal-to-Noise Ratio:** 54 dB  
(with standard tape)

**Flutter and Wow:** 0.04% at 7½ ips (19 cm/s)  
0.08% at 3¾ ips (9.5 cm/s)

**Recording Bias Frequency:** Approx. 120 kHz

**Inputs:** Two MIC inputs  
Impedance : 600 Ω  
Maximum sensitivity: 0.2 mV  
(-72 dB)

**Two LINE Inputs**  
Impedance : 100 kΩ  
Maximum sensitivity: 70 mV  
(-22 dB)

**REC/PB connector**  
Impedance : 80 kΩ  
Maximum sensitivity: 30.5 mV  
(-28 dB)

**Outputs:** Two LINE OUTPUTS  
Impedance : 100 kΩ  
Output level : 0.775 V (0 dB)

**REC/PB connector**  
Impedance : 100 kΩ  
Output level : 0.775 V (0 dB)

**HEADPHONE output**  
Impedance : 8 Ω load  
Output level : 0.038 V (-26 dB) with  
8 Ω load (when line  
output level is 0 dB.)

**Semiconductors:** 74 transistors and 92 diodes

**Dimensions:** 16<sup>5</sup>/<sub>8</sub> (W) x 18 (H) x 9<sup>9</sup>/<sub>16</sub> (D)  
(422 x 457 x 243 mm)

**Weight:** 44 lb 8 oz (20.2 kg)

# SONY®

## SERVICE MANUAL

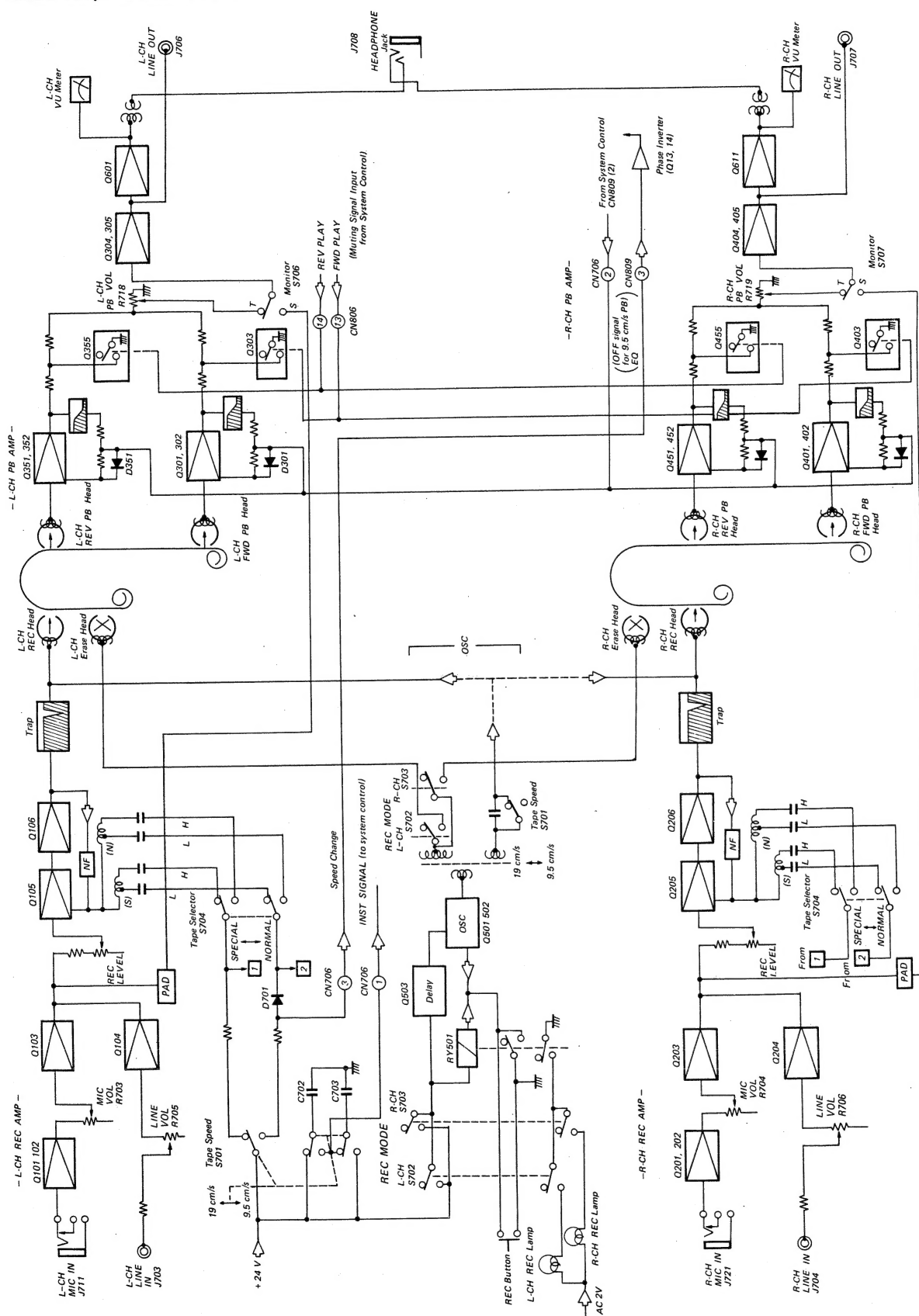
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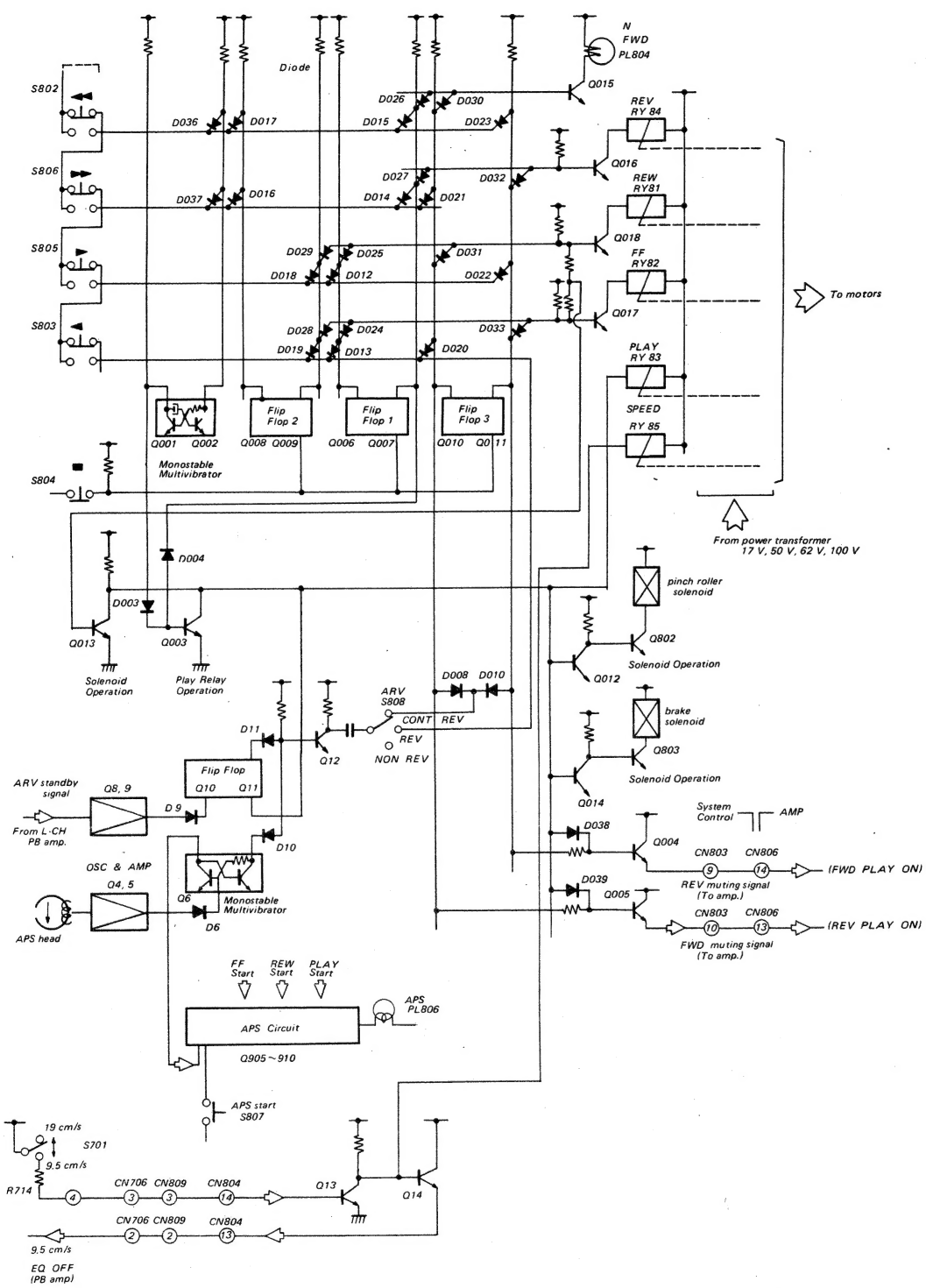
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## 1. BLOCK DIAGRAMS

### 1-1. Audio Amp. & Bias OSC Circuit



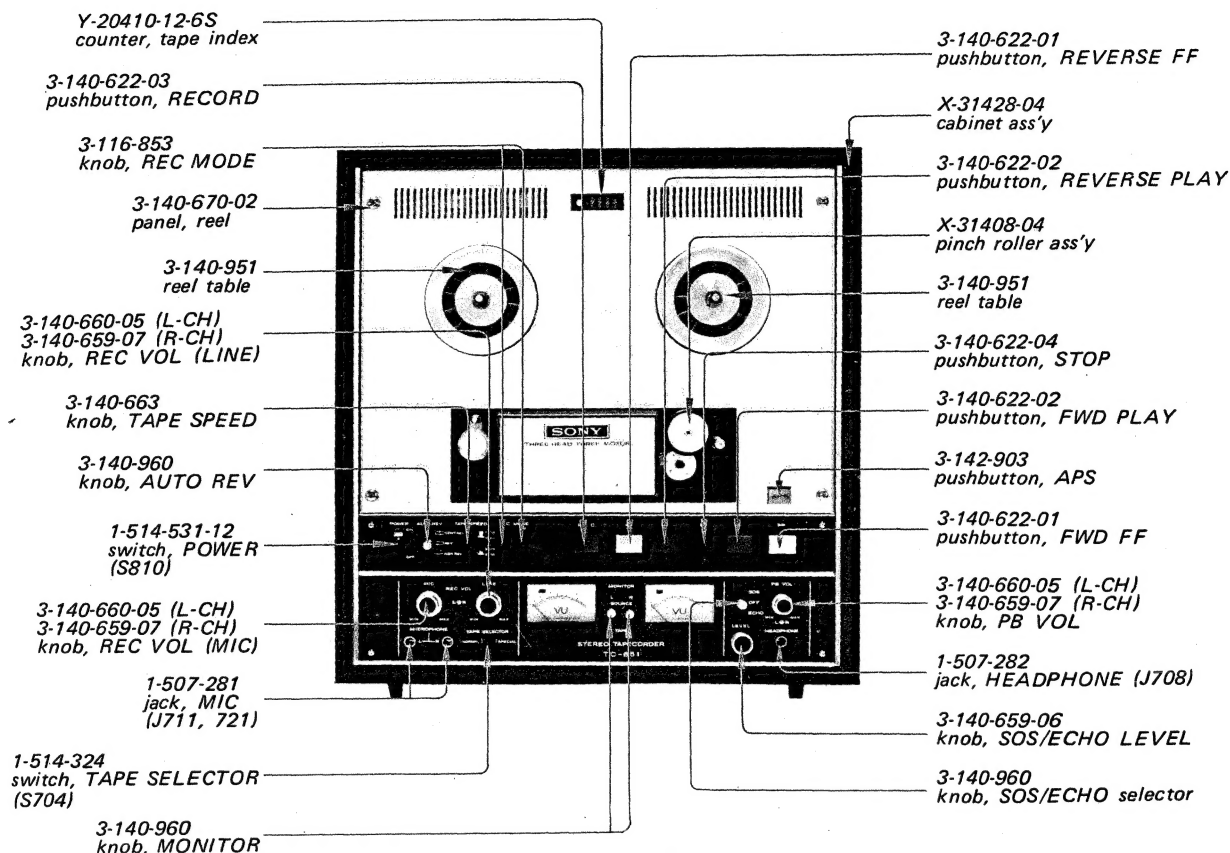
1-2. System Control Circuit



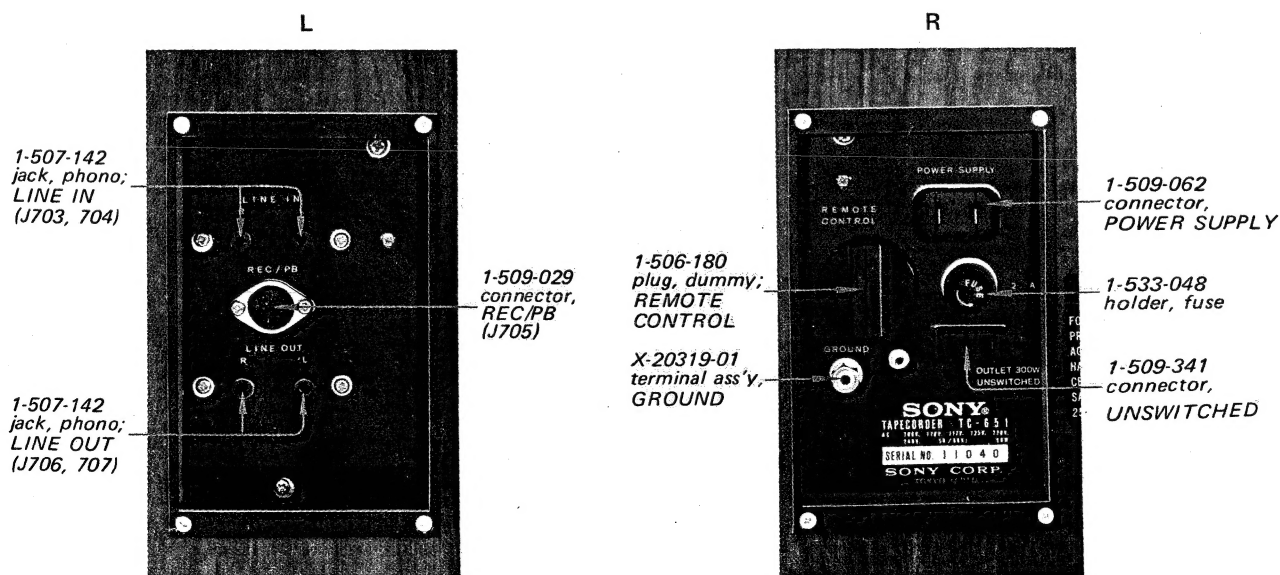


## 2. MAJOR PARTS LOCATIONS

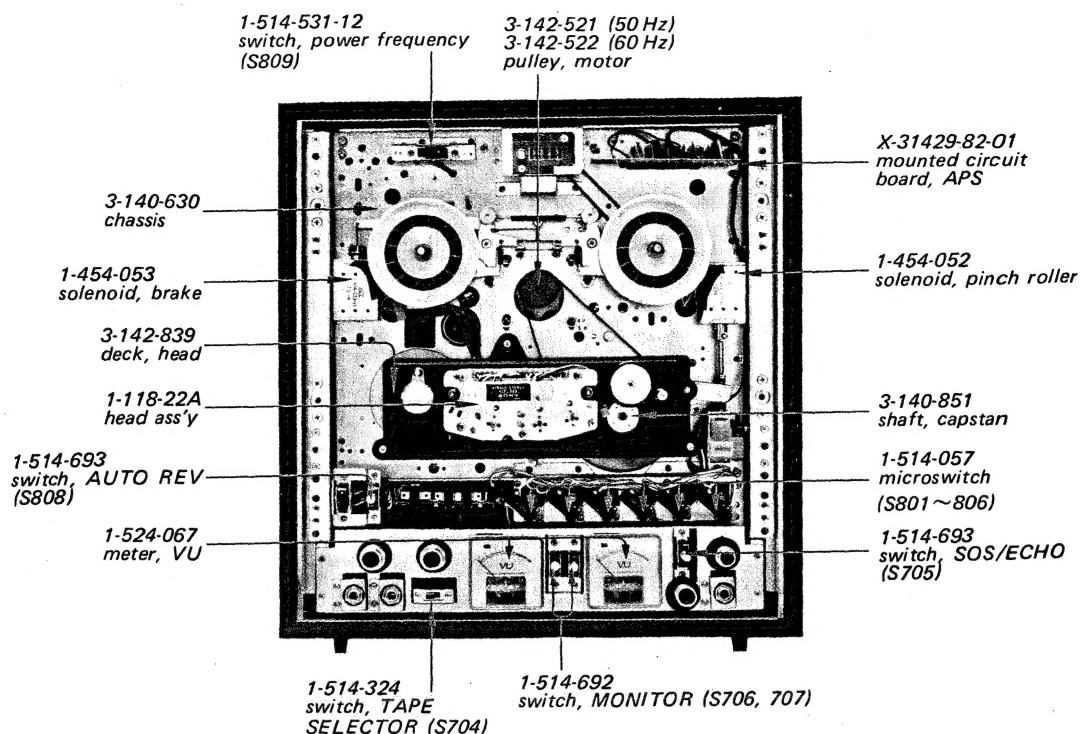
### 2-1. Cabinet Front View



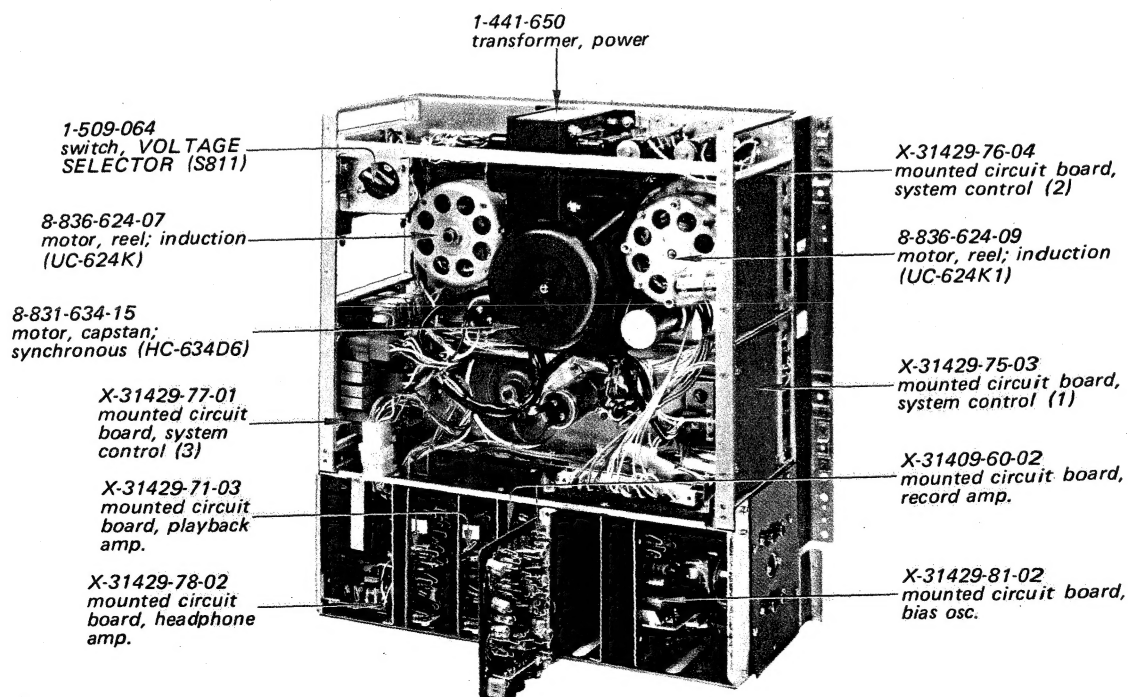
### 2-2. Cabinet Side Views



## 2-3. Chassis Top View



## 2-4. Chassis Bottom View



### 3. DISASSEMBLY

#### 3-1. Cabinet Removal

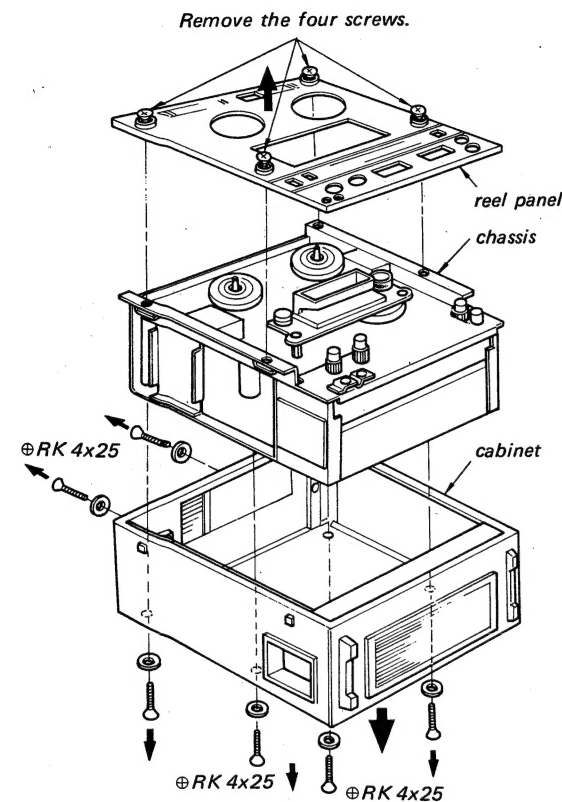


Fig. 3-1. Cabinet removal

#### 3-2. Printed Circuit Board Removal

1. Remove the Cabinet.
2. Pull off the printed circuit boards, PB AMP, REC AMP and BIAS OSC.

Note: The voltage check can be made by using the special jig (Part No. X-31400-99).

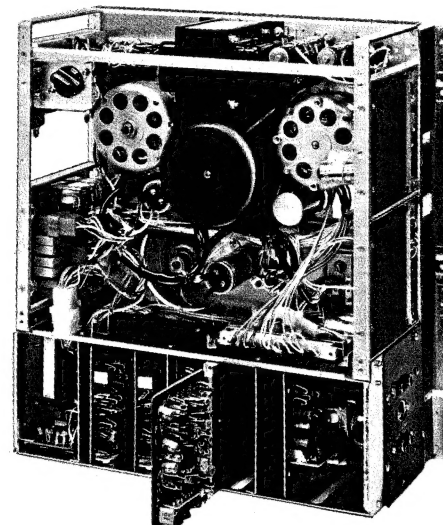
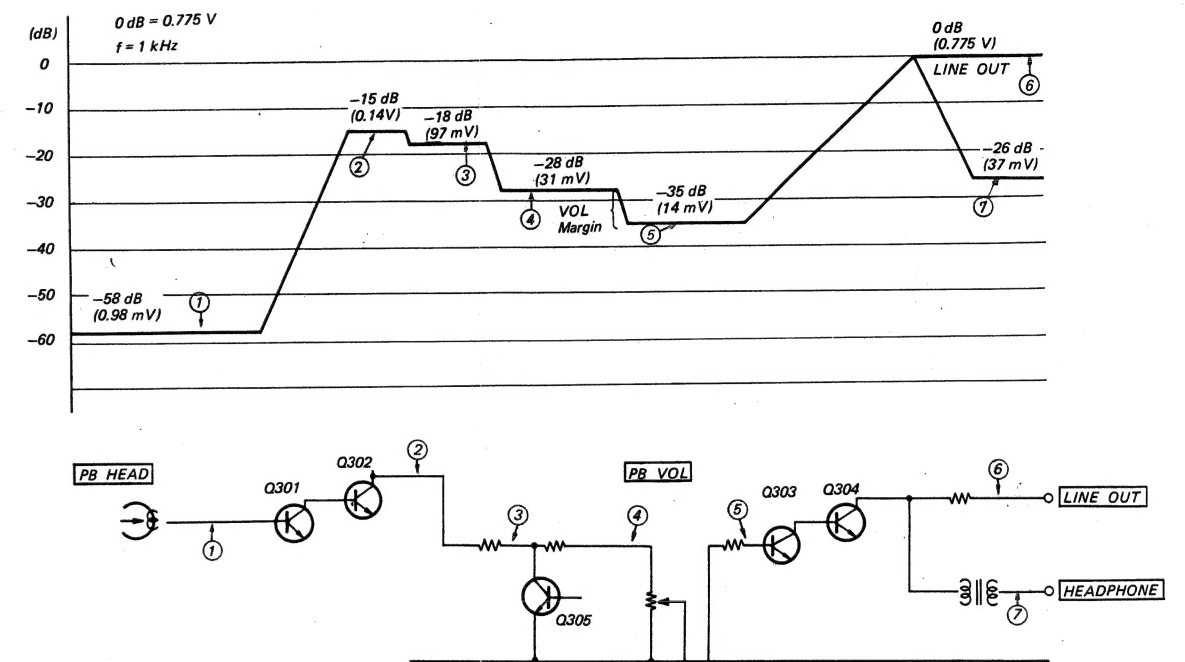


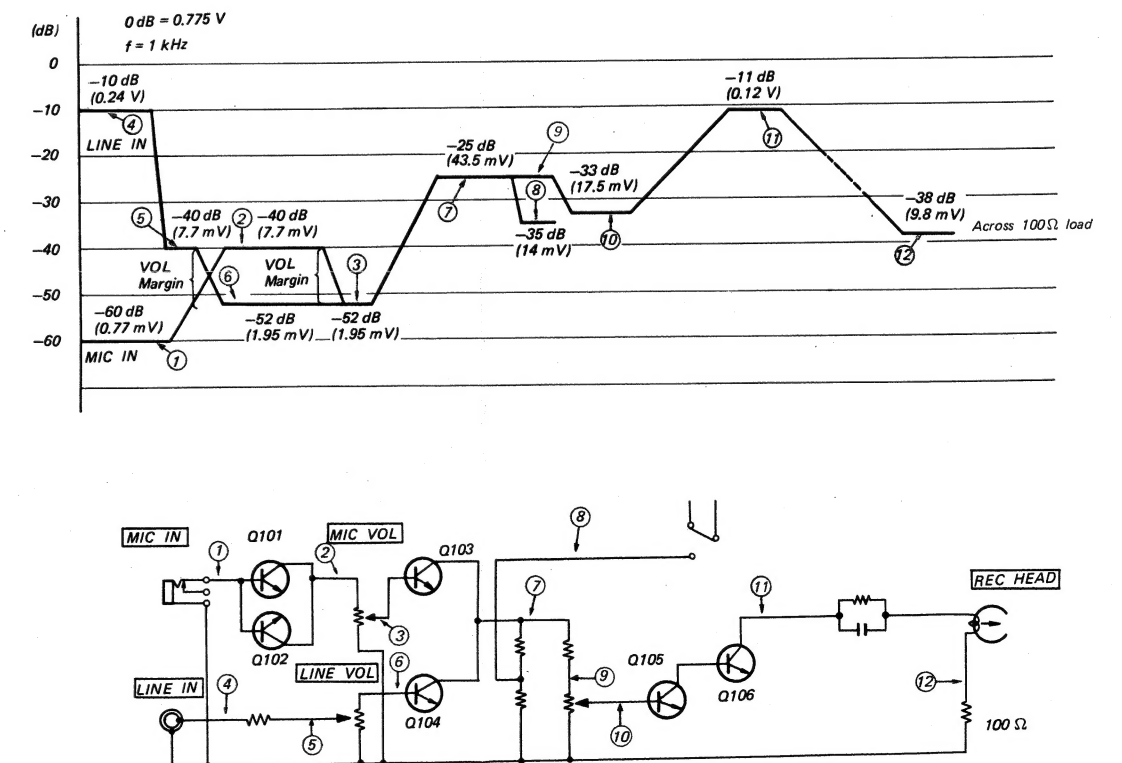
Fig. 3-2. Printed circuit board removal

### 4. LEVEL DIAGRAMS

#### 4-1. Playback

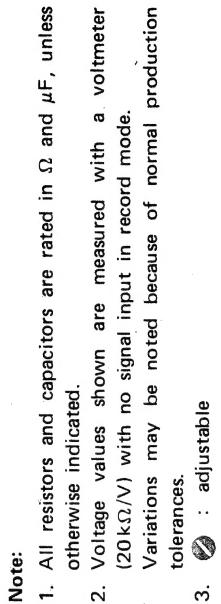


#### 4-2. Record



## 5. SCHEMATIC DIAGRAMS


### 5-1. Audio Amp. & Bias OSC Circuit

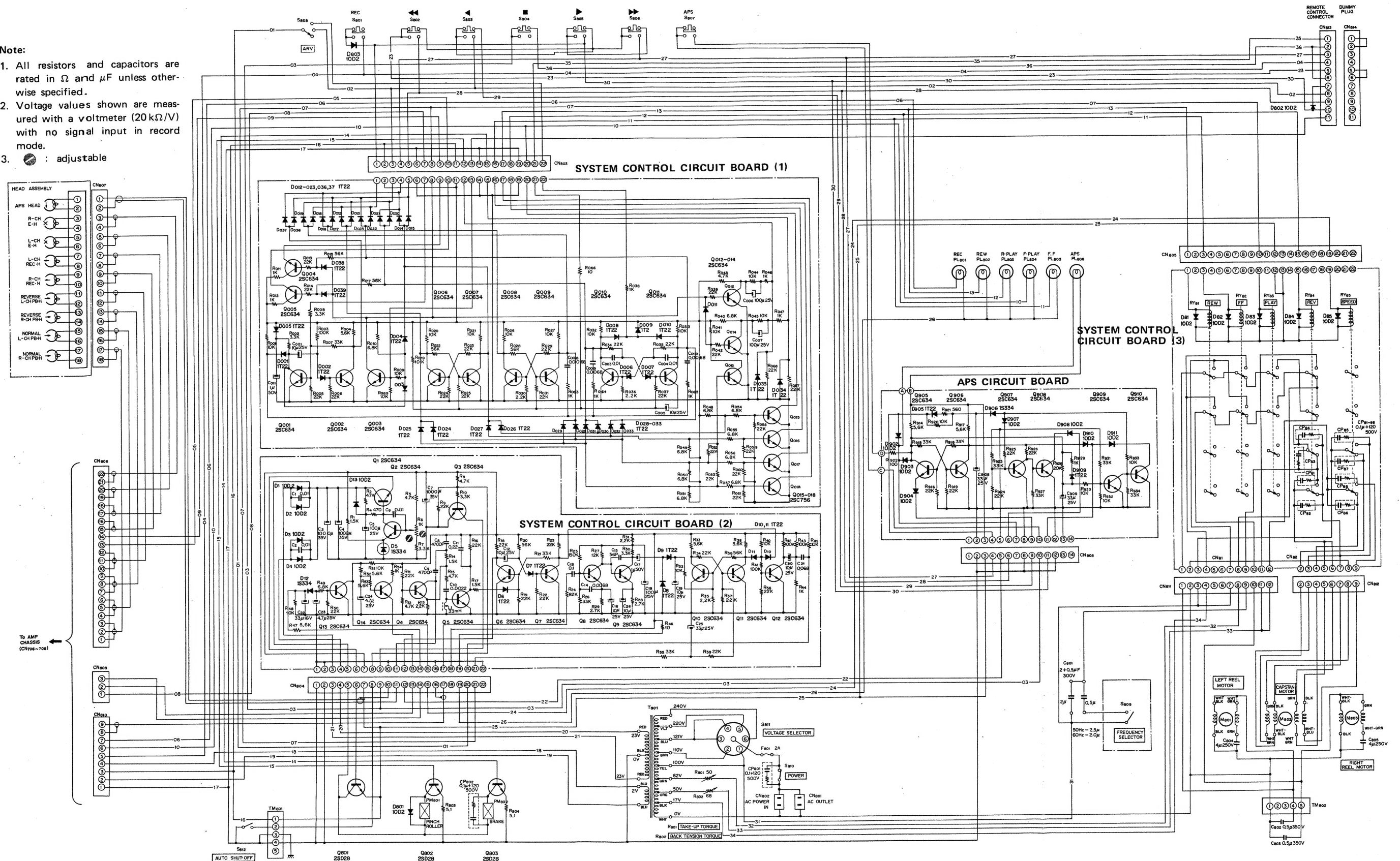




## 5-2. System Control Circuit

### Note:

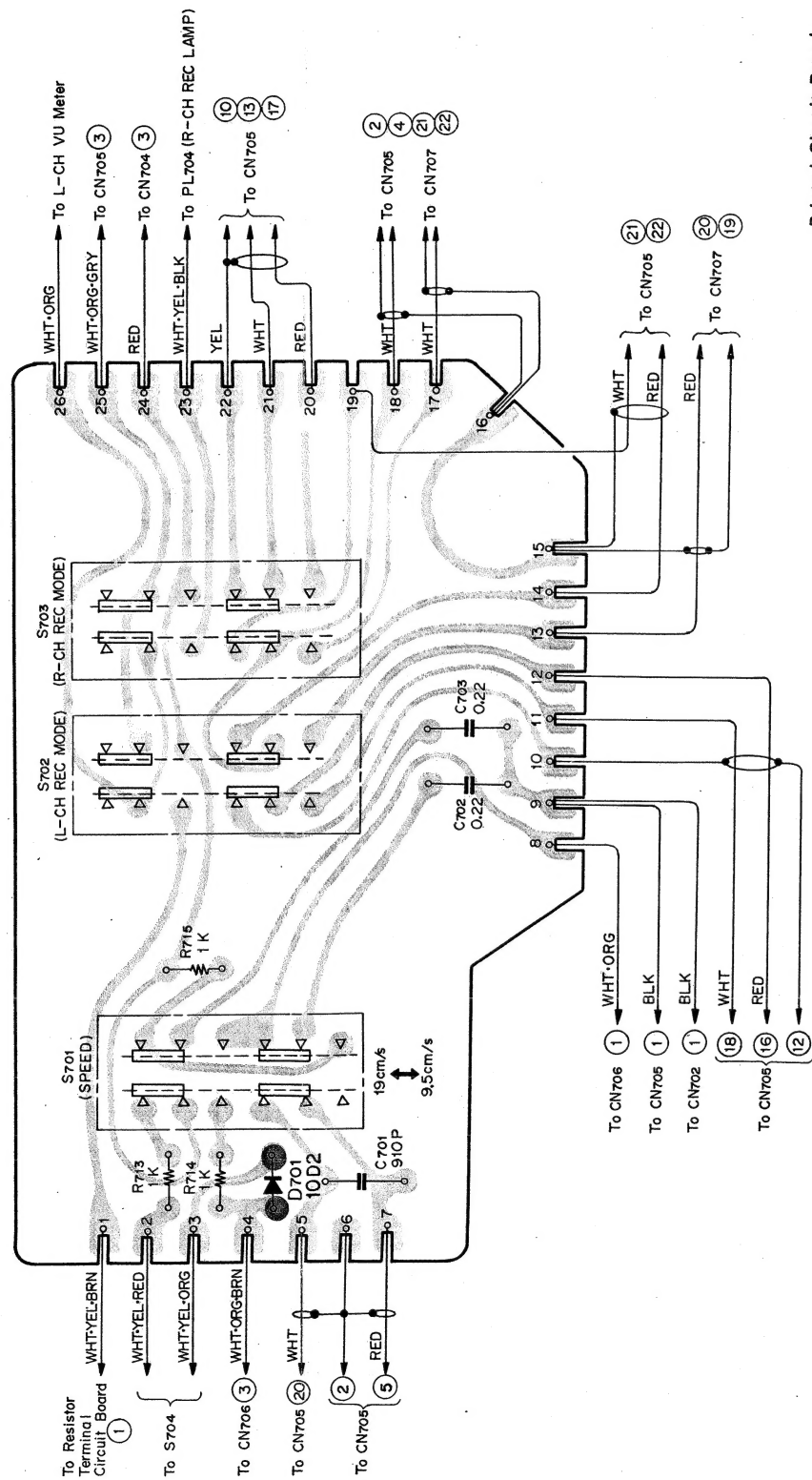
1. All resistors and capacitors are rated in  $\Omega$  and  $\mu F$  unless otherwise specified.
2. Voltage values shown are measured with a voltmeter (20 k $\Omega/V$ ) with no signal input in record mode.
3.  : adjustable



## 6. MOUNTING DIAGRAMS

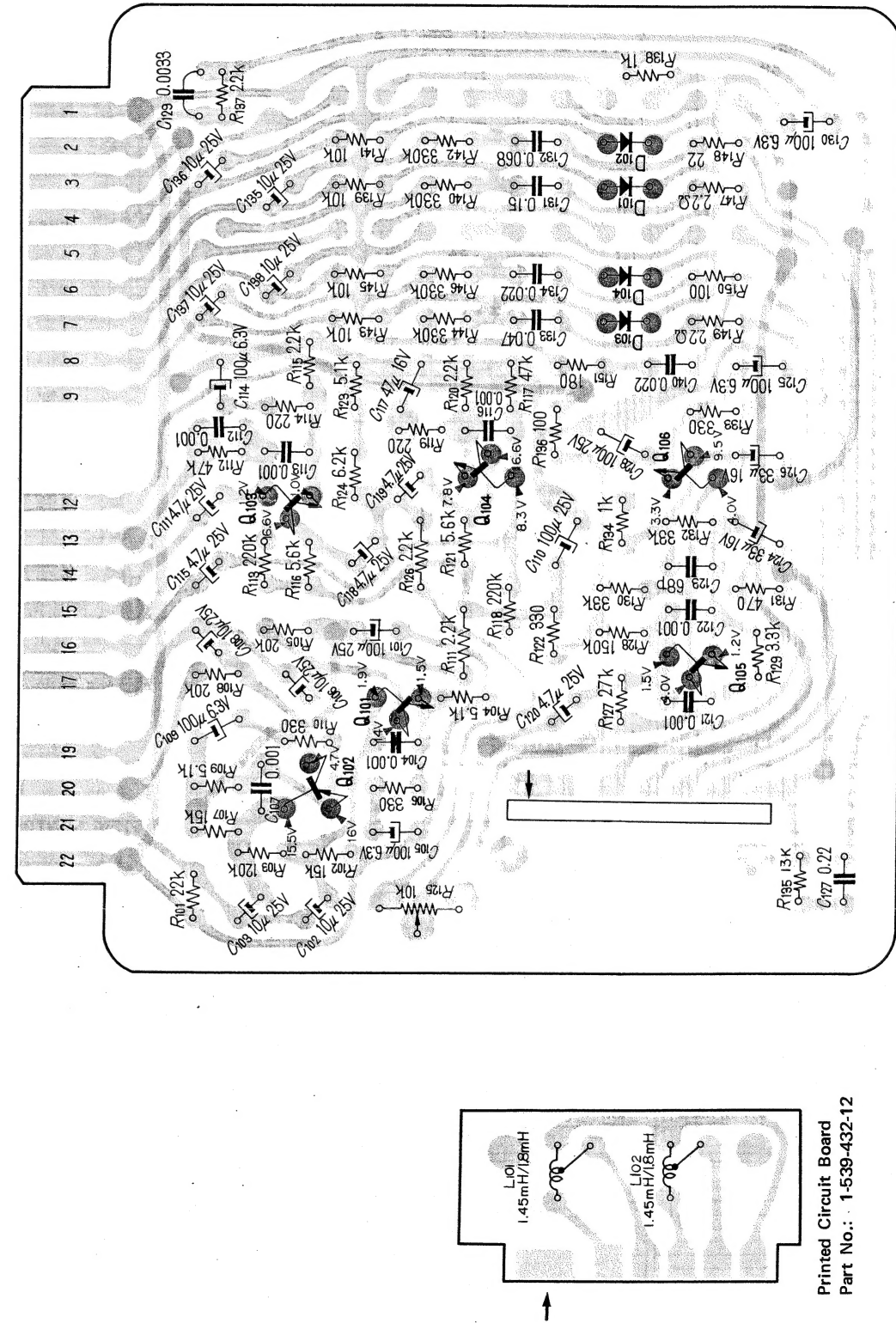
### 6-1. REC MODE & SPEED Switch Circuit Board

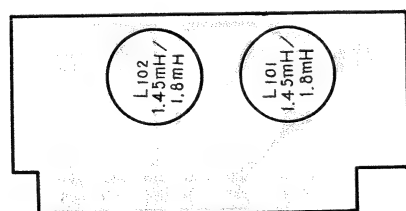
– Conductor Side –

Printed Circuit Board  
Part No. 1-539-565-11

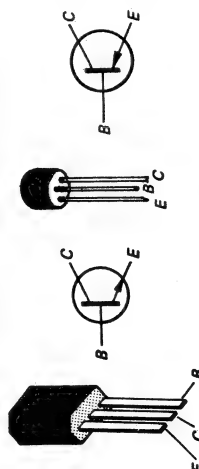
## 6-2. Record Amplifier Circuit Board

– Conductor Side –

Printed Circuit Board  
Part No. 1-539-431-14



**2SC631A, 2SC634A**

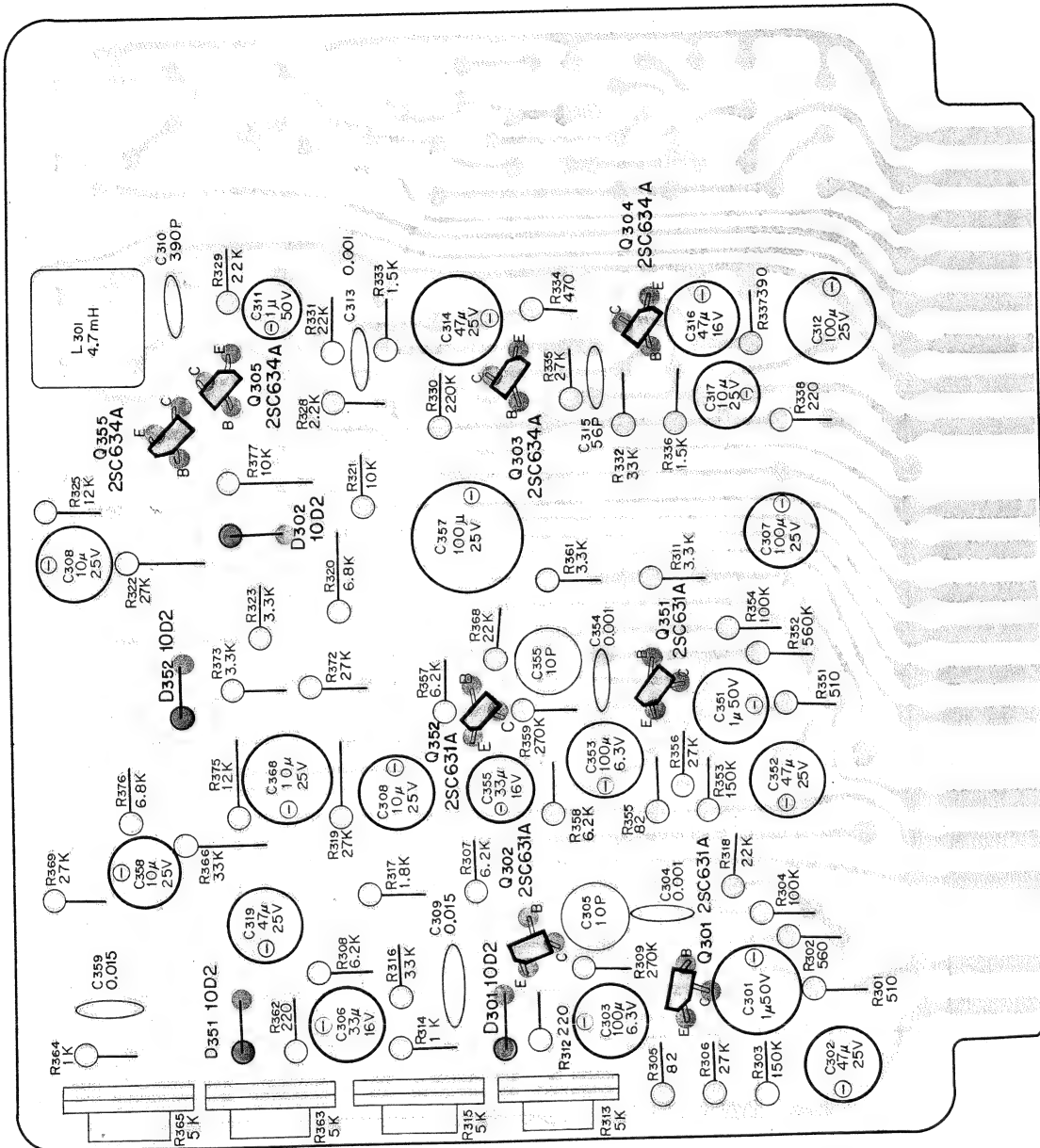


The image shows two circuit symbols. The top symbol is a diode, represented by a horizontal line with a triangle pointing to the right. The bottom symbol is a capacitor, represented by two parallel horizontal lines of equal length.

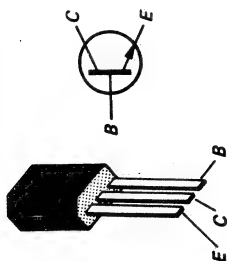




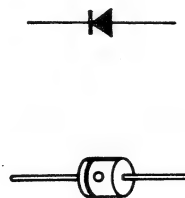
6.3. Playback Amplifier Circuit Board  
— Component Side —



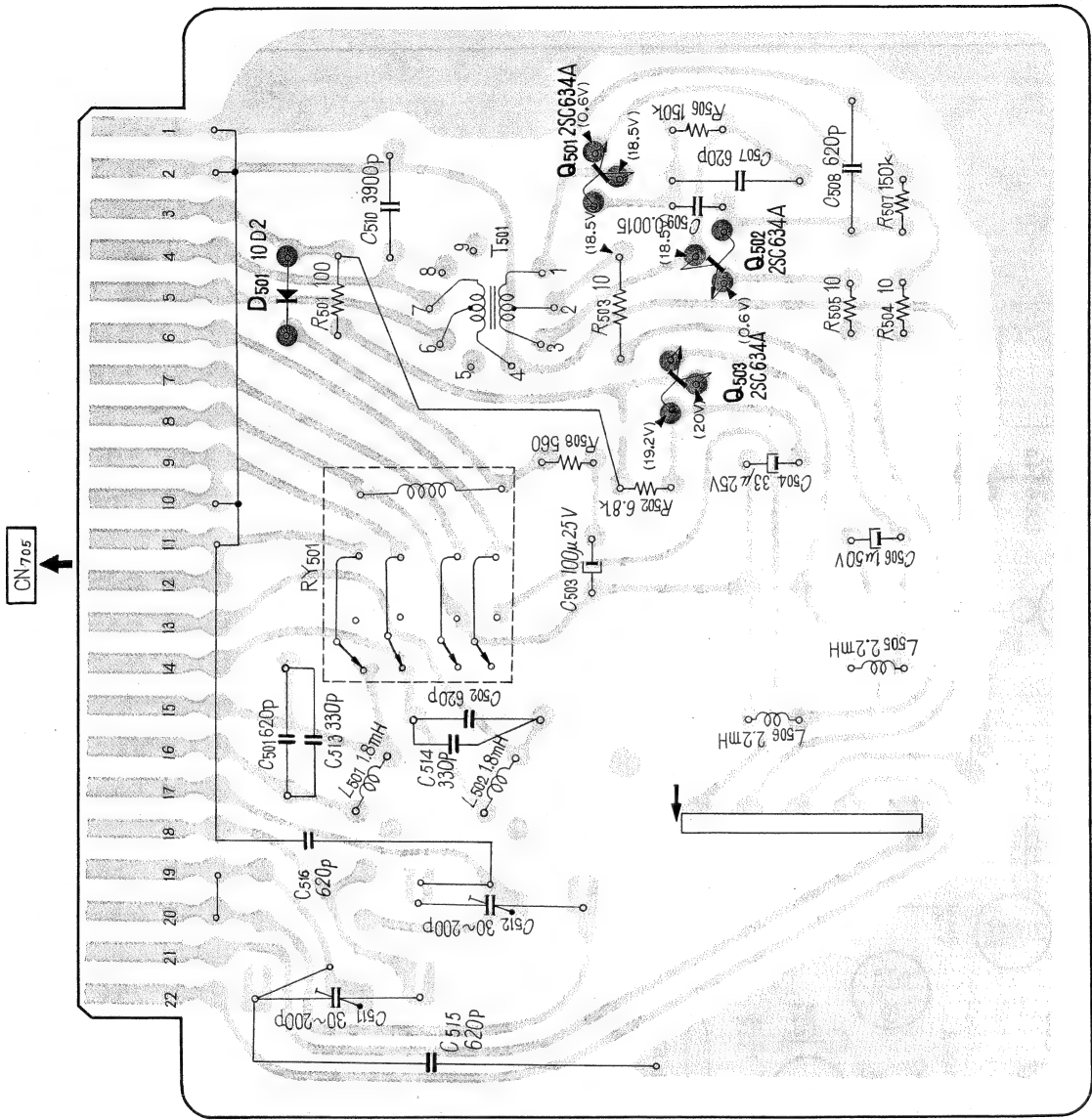
2SC631A, 2SC634A



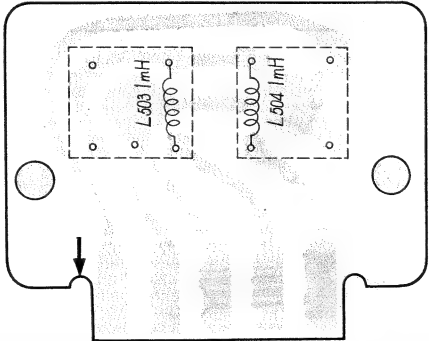
10D2



6-4. BIAS OSC Circuit Board  
 - Conductor Side -

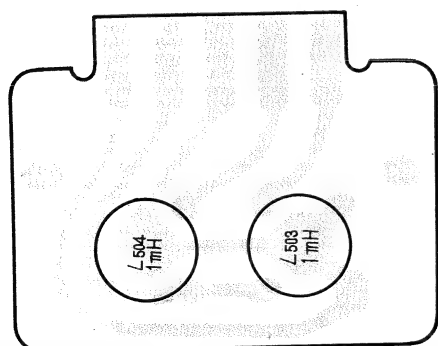
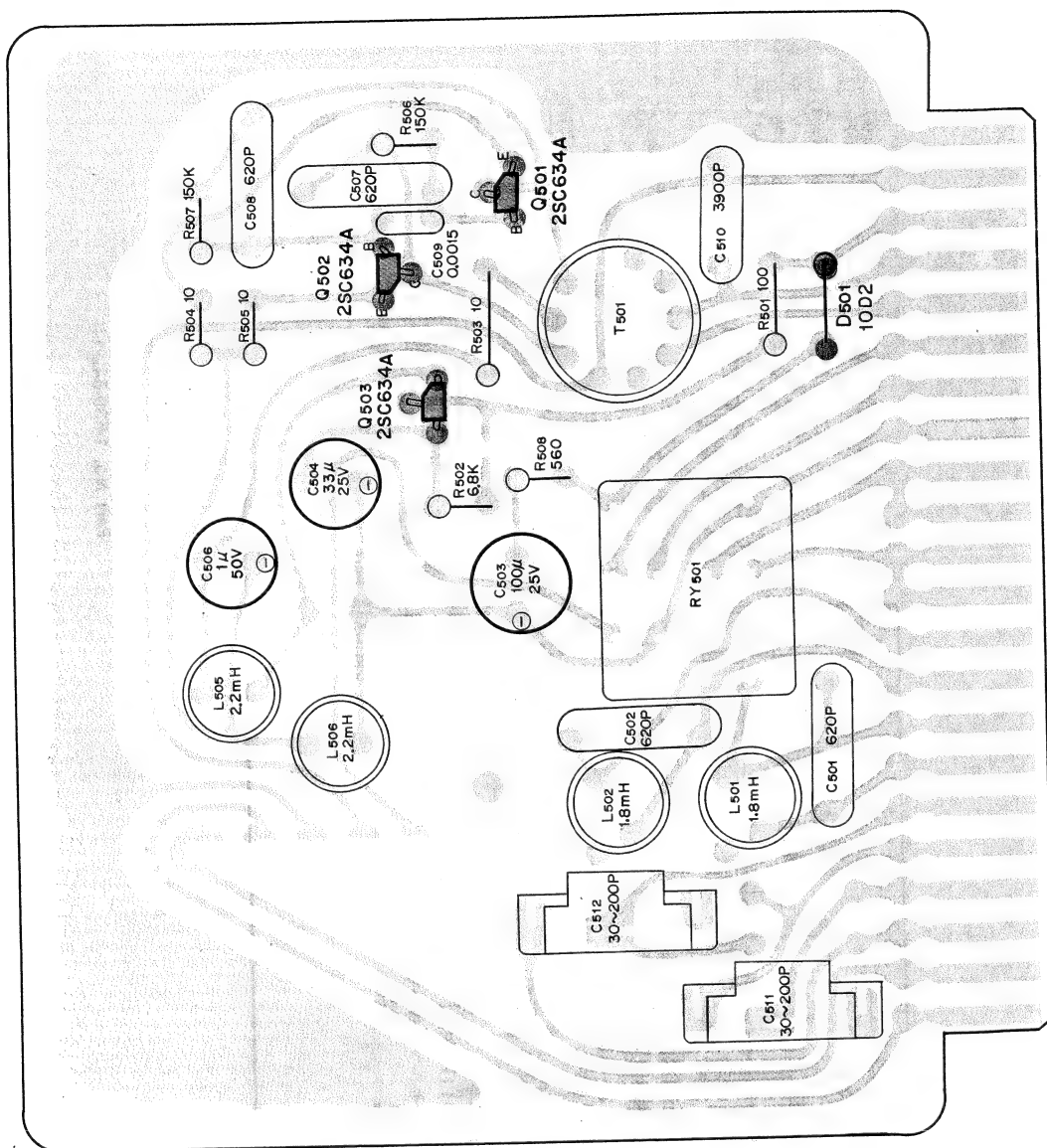


Printed Circuit Board  
 Part No. 1-539-558-12

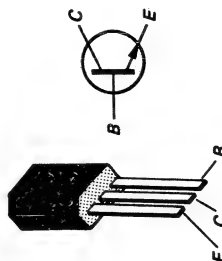


Printed Circuit Board  
 Part No. 1-539-563-12

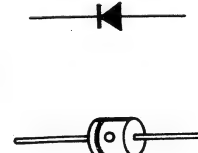
6-4. BIAS OSC Circuit Board  
— Component Side —



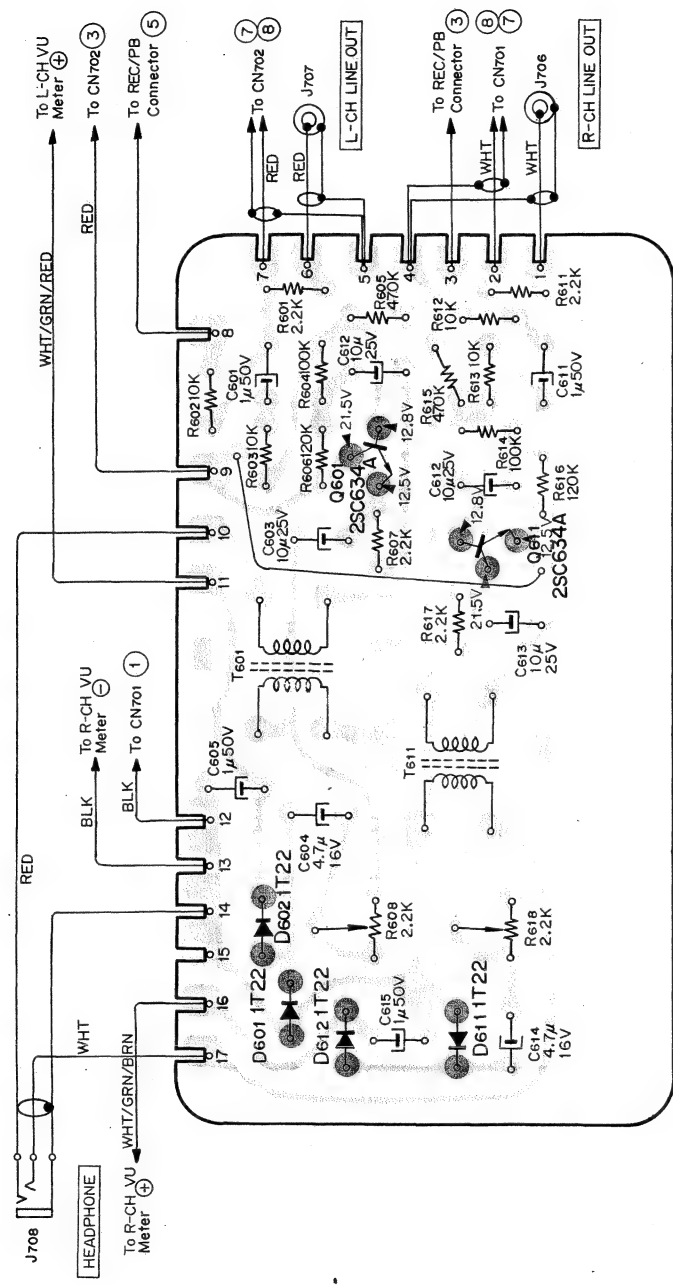
2SC634A



10D2

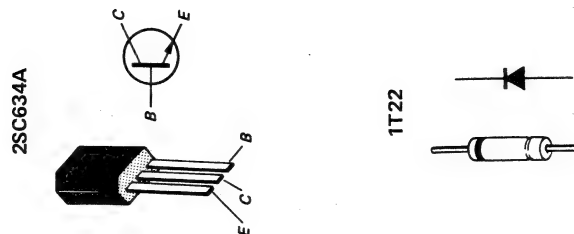
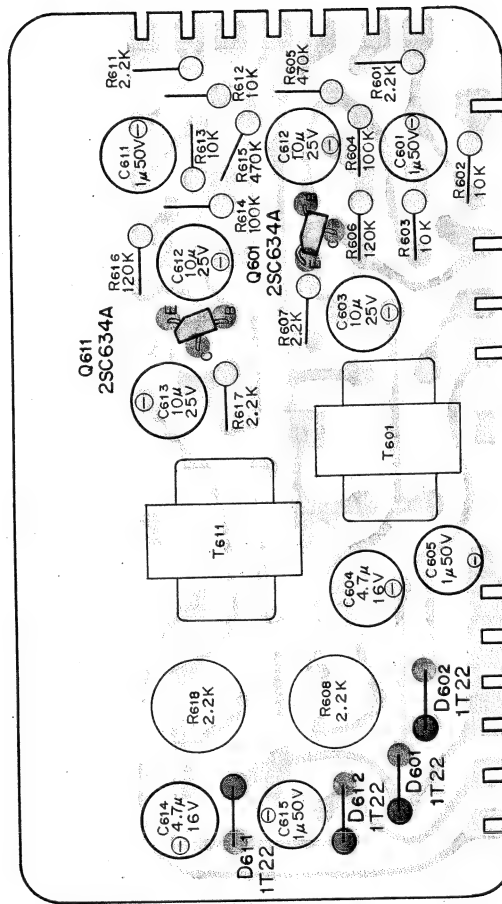


6-5. Headphone Amplifier Circuit Board  
— Conductor Side —

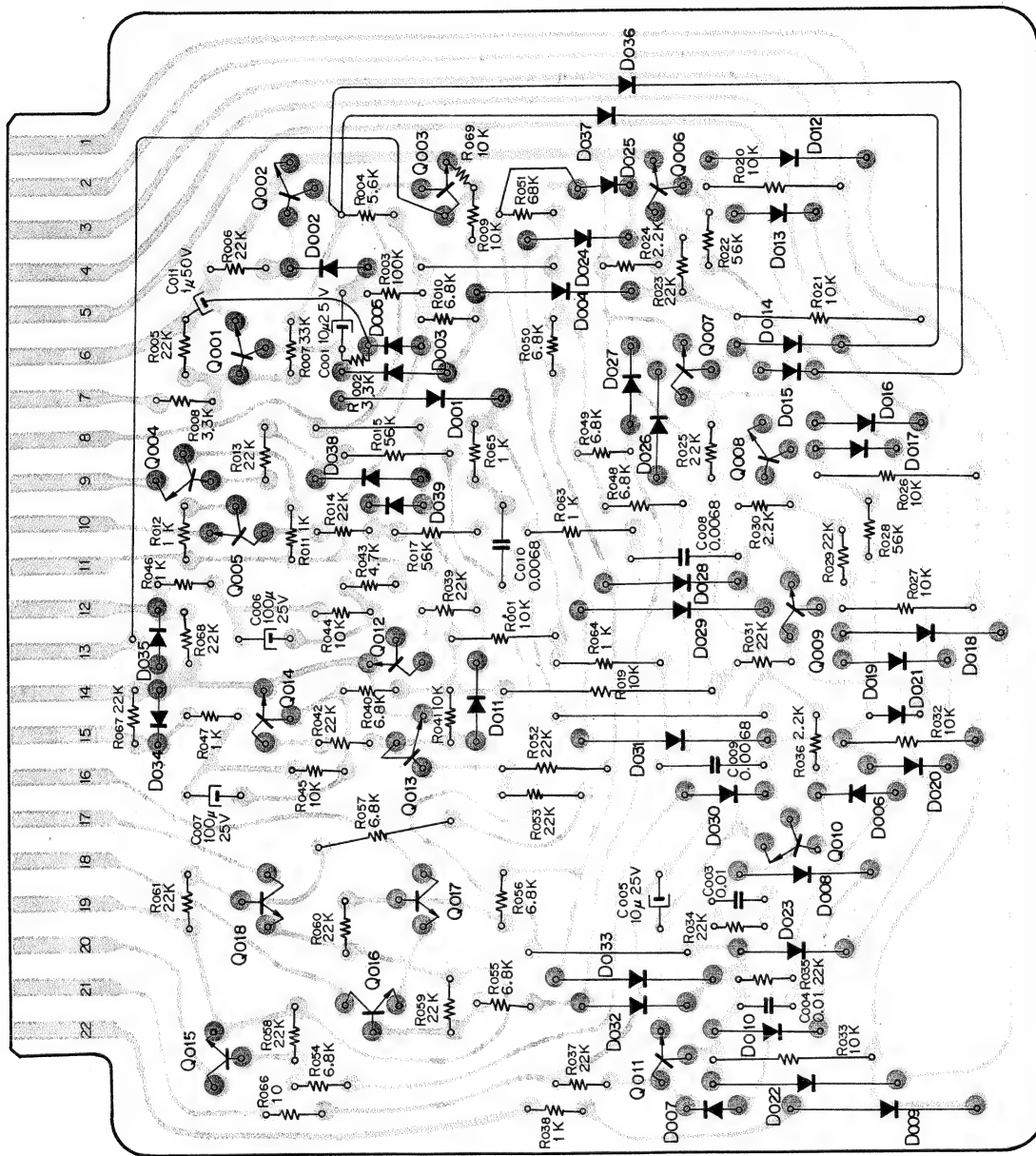


Printed Circuit Board  
Part No. 1-539-642-11

6-5. Headphone Amplifier Circuit Board  
— Component Side —



6-6. System Control Circuit Board (1)  
— Conductor Side —

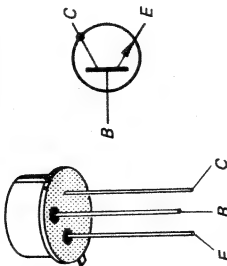
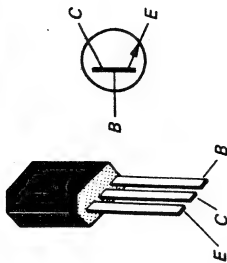
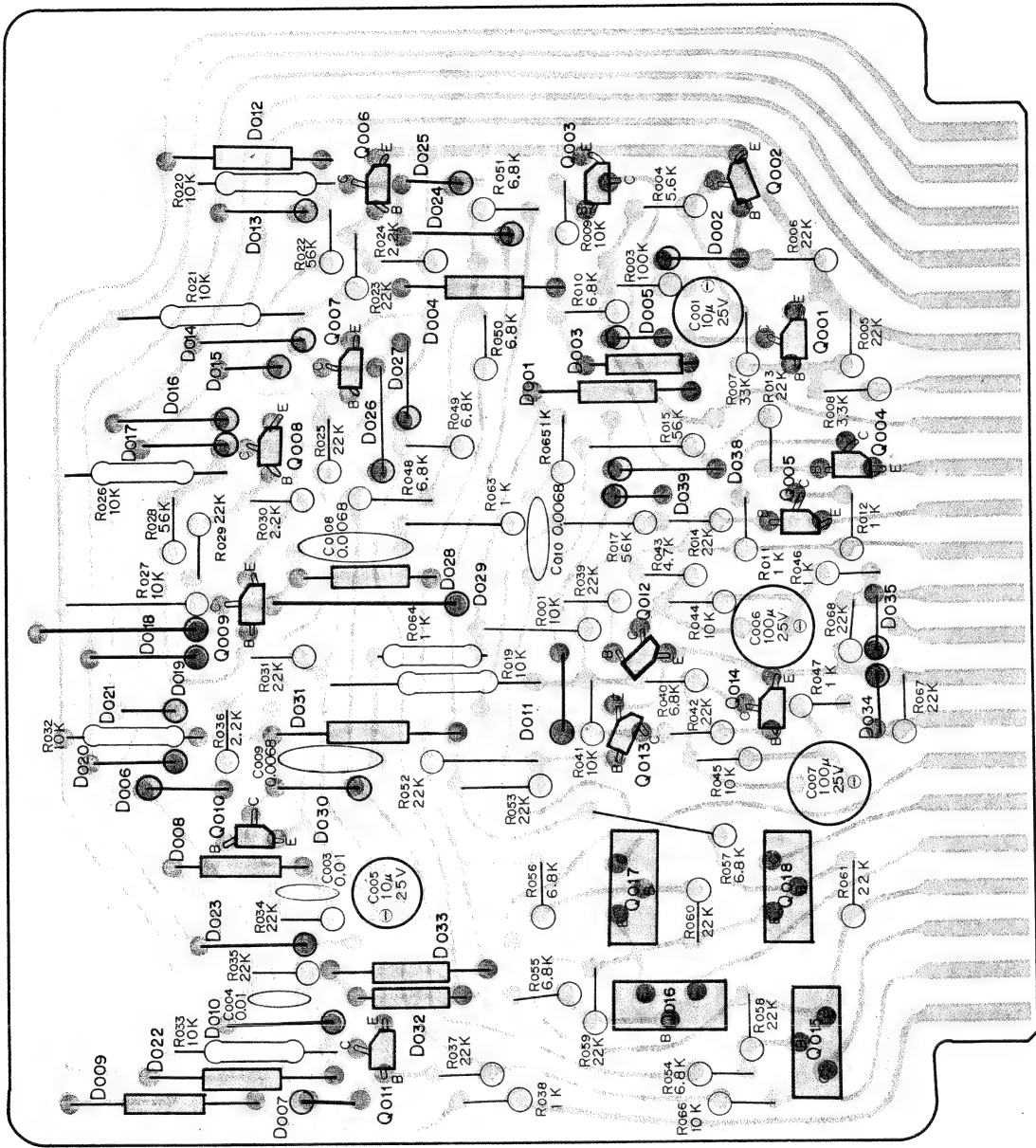


Printed Circuit Board  
Part No. 1-539-633-12



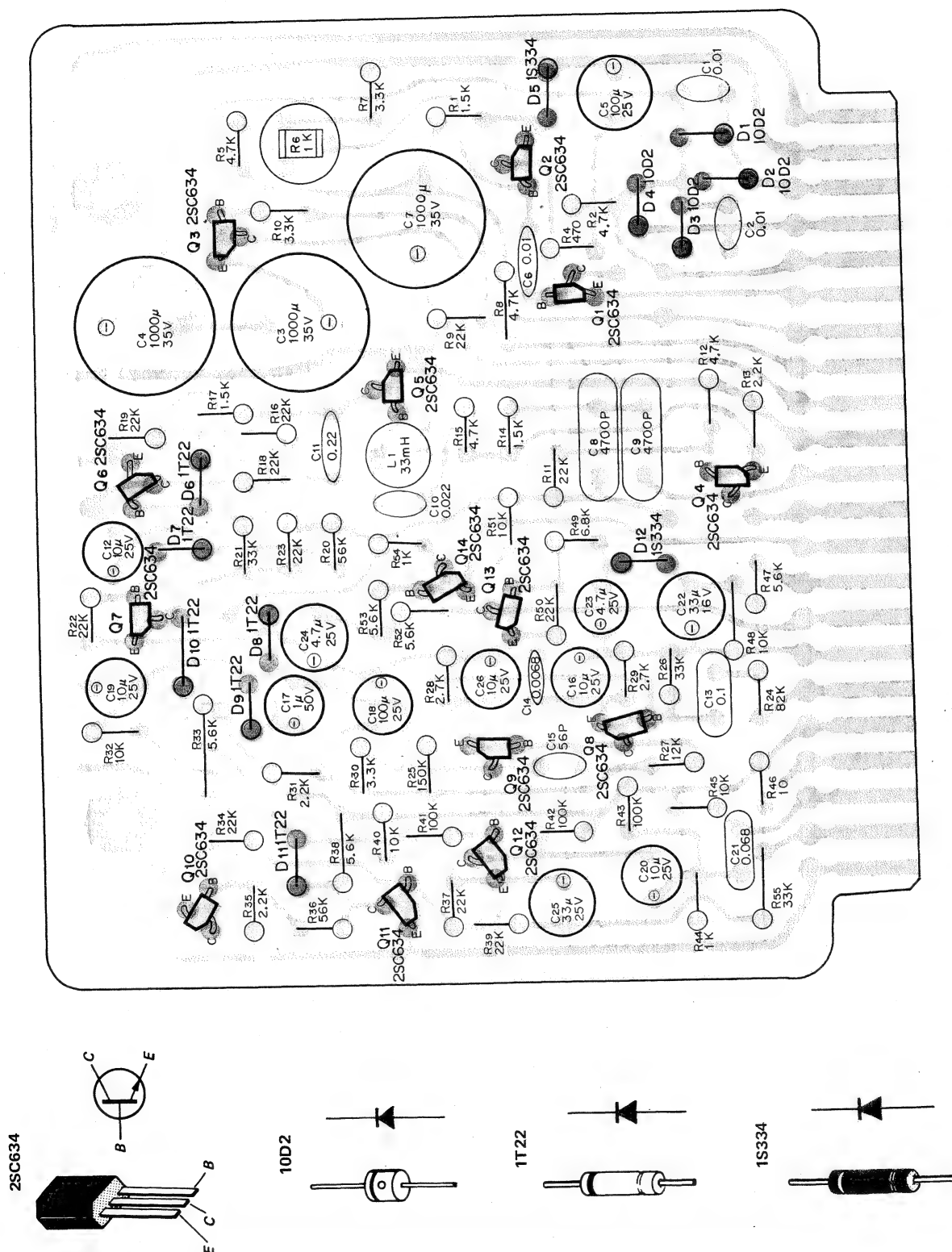
### 6-6. System Control Circuit Board (1)

— Component Side —

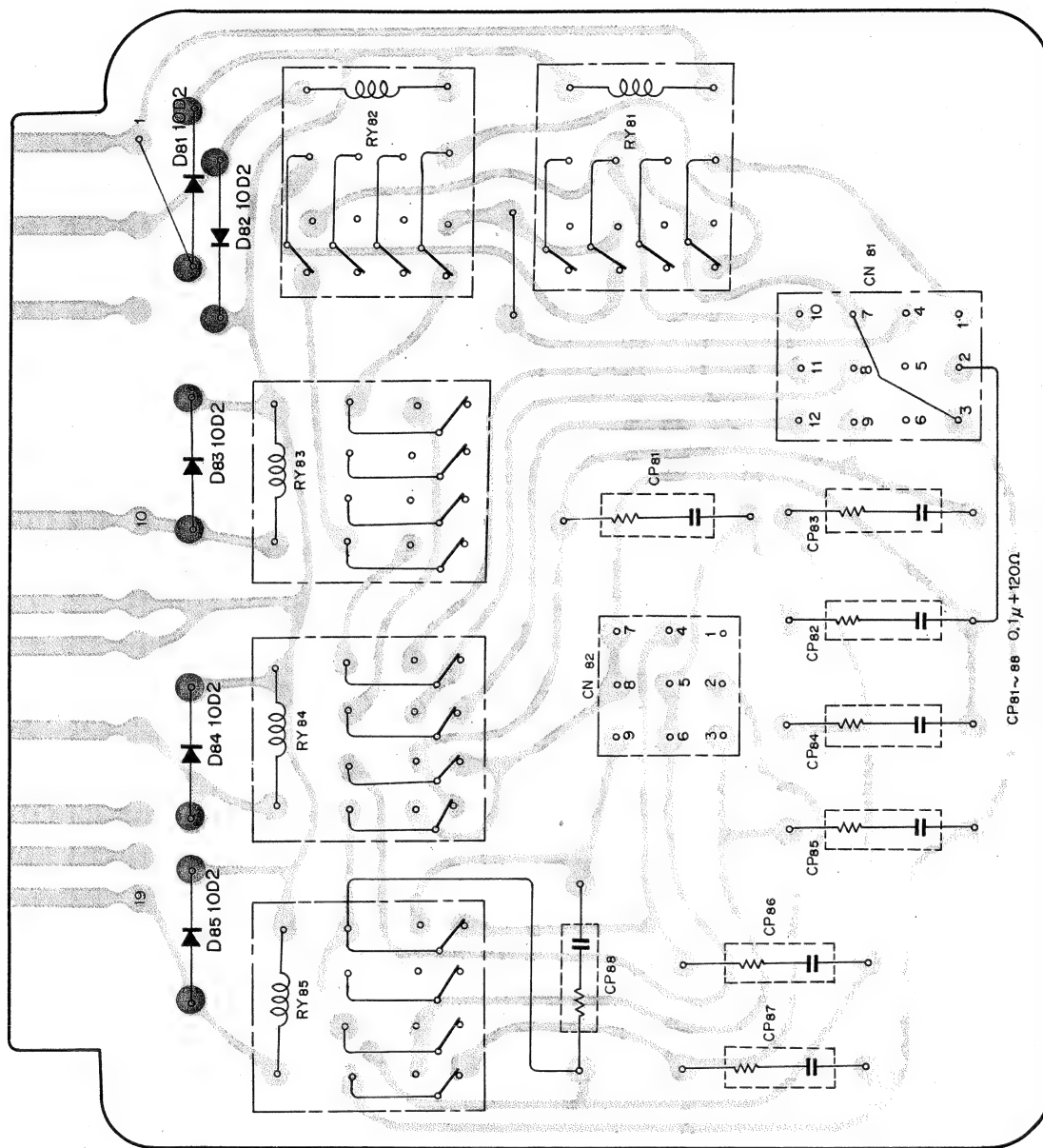




6-7. System Control Circuit Board (2)  
— Component Side —

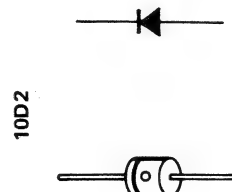
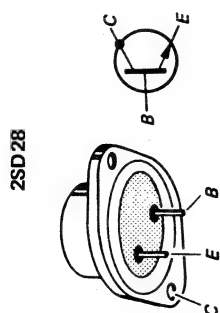
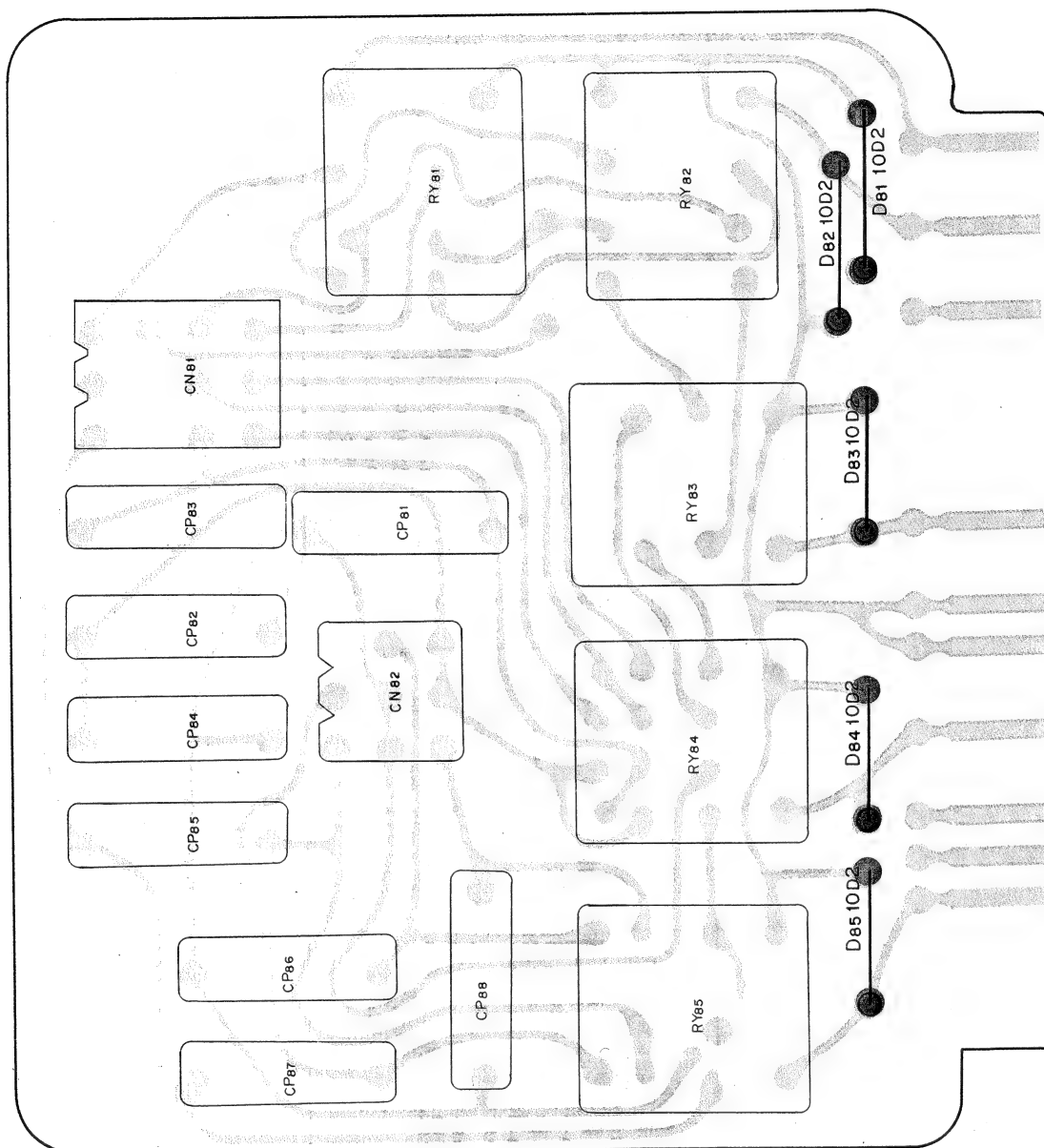


6-8. System Control Circuit Board (3)  
 — Conductor Side —

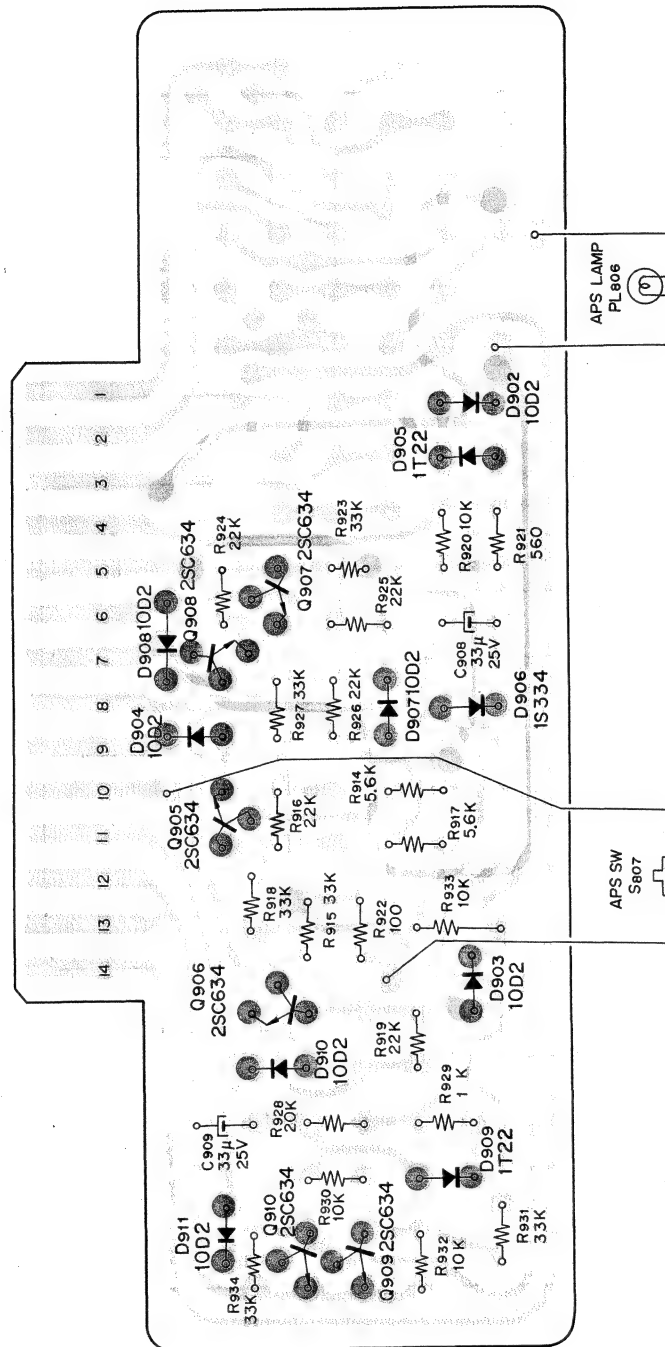


Printed Circuit Board  
 Part No. 1-539-635-11

6-8. System Control Circuit Board (3)  
— Component Side —



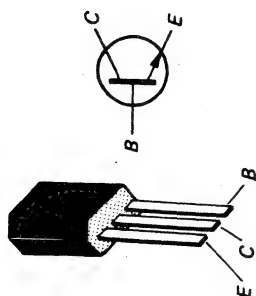
6-9. APS Circuit Board  
— Conductor Side —



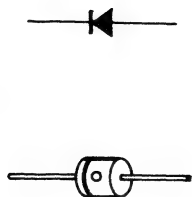
Printed Circuit Board  
Part No. 1-539-568-11

6-9. APS Circuit Board  
— Component Side —

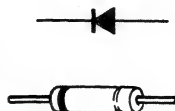
2SC634



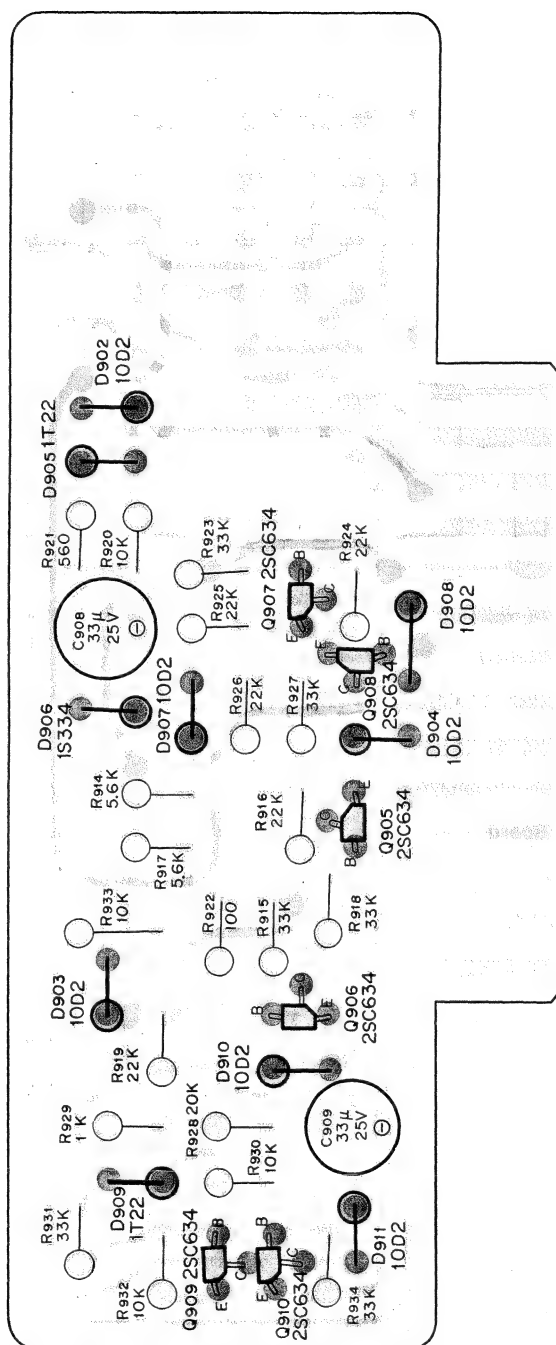
10D2



1T22

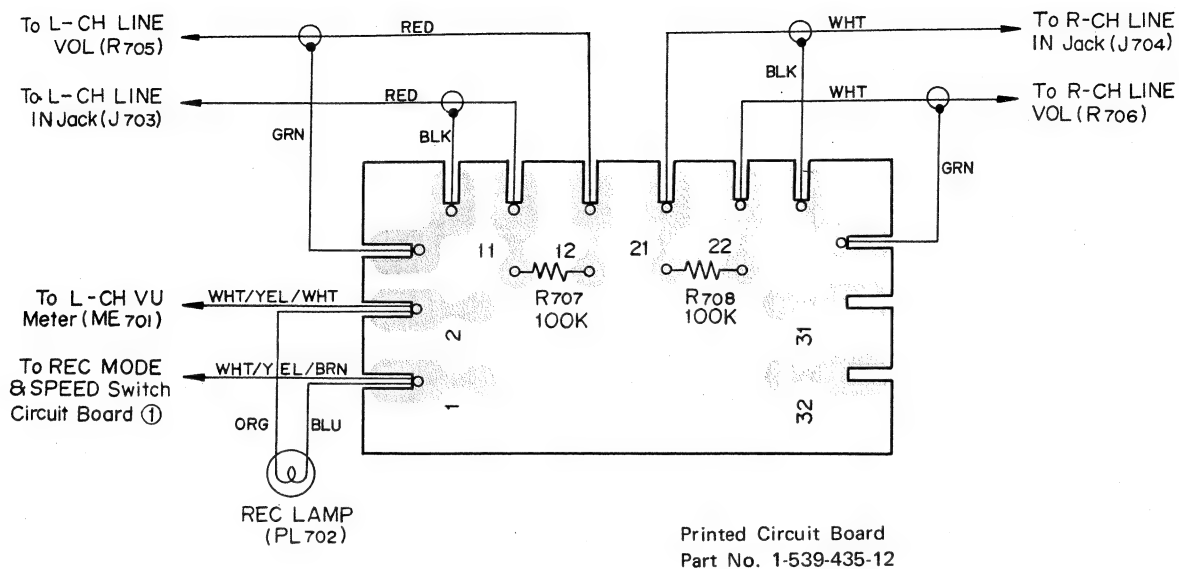


1S334

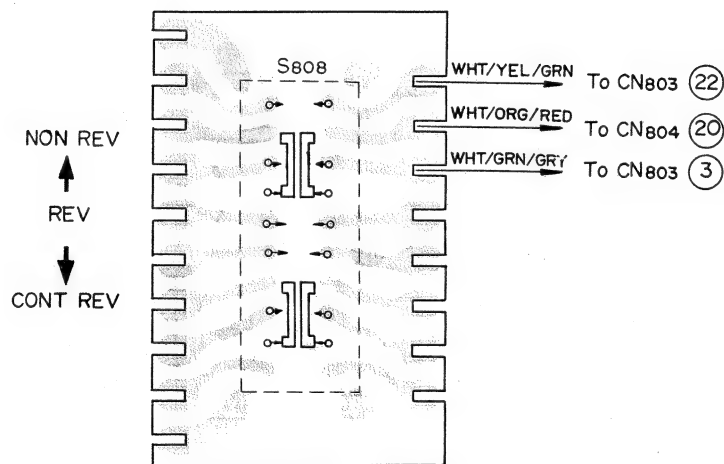




**6-10. Resistor Terminal Circuit Board**  
 — Conductor Side —



**6-11. ARV Switch Circuit Board**  
 — Conductor Side —



## 7. ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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**MOUNTED CIRCUIT BOARDS**

X-31409-60-02	REC amp.
X-31429-71-03	PB amp.
X-31429-81-02	bias osc.
X-31429-78-02	headphone amp.
X-31429-82-01	REC mode & speed switch
X-31429-57-01	resistor terminal
X-31409-65-01	ECHO & SOS
X-31429-75-03	system control (1)
X-31429-76-04	system control (2)
X-31429-77-01	system control (3)
X-31429-82-01	APS
X-31429-58-01	ARV switch

**PRINTED CIRCUIT BOARDS**

1-539-431-14	REC amp.
1-539-432-12	sub. (REC amp.)
1-539-641-11	PB amp.
1-539-558-12	bias osc.
1-539-563-12	sub. (bias osc.)
1-539-642-11	headphone amp.
1-539-565-11	REC mode & speed switch
1-539-435-12	resistor terminal
1-539-560-11	ECHO & SOS
1-539-633-12	system control (1)
1-539-634-12	system control (2)
1-539-635-11	system control (3)
1-539-568-11	APS
1-539-443-11	ARV switch
1-539-436-11	head connector
1-539-437-11	docking
1-539-663-11	pilot lamp holding

**RECORD AMP CIRCUIT****SEMICONDUCTORS**

Q101, 201	transistor	2SC631A
Q102, 202	transistor	2SA610
Q103, 203	transistor	2SC631A
Q104, 204	transistor	2SC634A
Q105, 205	transistor	2SC634A
Q106, 206	transistor	2SC634A

D101, 201	diode	10D-2
D102, 202	diode	10D-2
D103, 203	diode	10D-2
D104, 204	diode	10D-2

**COILS**

L101, 201	1-231-069	equalizer	1.45/1.8 mH
L102, 202	1-231-069	equalizer	1.45/1.8 mH

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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**CAPACITORS**

C101, 201	1-121-416	100μF	25 V	electrolytic
C102, 202	1-121-398	10μF	25 V	electrolytic
C103, 203	1-121-398	10μF	25 V	electrolytic
C104, 204	1-105-661-12	0.001μF	50 V	mylar
C105, 205	1-121-413	100μF	6.3 V	electrolytic
C106, 206	1-121-398	10μF	25 V	electrolytic
C107, 207	1-105-661-12	0.001μF	50 V	mylar
C108, 208	1-121-398	10μF	25 V	electrolytic
C109, 209	1-121-413	100μF	6.3 V	electrolytic
C110, 210	1-121-416	100μF	25 V	electrolytic
C111, 211	1-121-395	4.7μF	25 V	electrolytic
C112, 212	1-105-661-12	0.001μF	50 V	mylar
C113, 213	1-105-661-12	0.001μF	50 V	mylar
C114, 214	1-121-413	100μF	6.3 V	electrolytic
C115, 215	1-121-395	4.7μF	25 V	electrolytic
C116, 216	1-105-661-12	0.001μF	50 V	mylar
C117, 217	1-121-409	47μF	16 V	electrolytic
C118, 218	1-121-395	4.7μF	25 V	electrolytic
C119, 219	1-121-395	4.7μF	25 V	electrolytic
C120, 220	1-121-395	4.7μF	25 V	electrolytic
C121, 221	1-105-661-12	0.001μF	50 V	mylar
C122, 222	1-105-661-12	0.001μF	50 V	mylar
C123, 223	1-107-127	68pF	50 V	silvered mica
C124, 224	1-121-403	33μF	16 V	electrolytic
C125, 225	1-121-413	100μF	6.3 V	electrolytic
C126, 226	1-121-398	10μF	25 V	electrolytic
C127, 227	1-105-689-12	0.22μF	50 V	mylar
C128, 228	1-121-416	100μF	25 V	electrolytic
C129, 229	1-105-671-12	0.0068μF	50 V	mylar
C130, 230	1-121-413	100μF	6.3 V	electrolytic
C131, 231	1-105-685-12	0.1μF	50 V	mylar
C132, 232	1-105-681-12	0.047μF	50 V	mylar
C133, 233	1-105-681-12	0.047μF	50 V	mylar
C134, 234	1-105-677-12	0.022μF	50 V	mylar
C135, 235	1-121-398	10μF	25 V	electrolytic
C136, 236	1-121-398	10μF	25 V	electrolytic
C137, 237	1-121-398	10μF	25 V	electrolytic
C138, 238	1-121-398	10μF	25 V	electrolytic

**RESISTORS**

All resistors are 1/4W, carbon type, unless otherwise specified.

R101, 201	1-242-705	22kΩ
R102, 202	1-242-701	15kΩ
R103, 203	1-242-723	120kΩ
R104, 204	1-242-690	5.1kΩ
R105, 205	1-242-704	20kΩ
R106, 206	1-242-661	330Ω
R107, 207	1-242-701	15kΩ
R108, 208	1-242-704	20kΩ
R109, 209	1-242-690	5.1kΩ
R110, 210	1-242-661	330Ω

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R111, 211	1-242-681	2.2k $\Omega$
R112, 212	1-242-713	47k $\Omega$
R113, 213	1-242-729	220k $\Omega$
R114, 214	1-242-657	220 $\Omega$
R115, 215	1-242-681	2.2k $\Omega$
R116, 216	1-242-691	5.6k $\Omega$
R117, 217	1-242-713	47k $\Omega$
R118, 218	1-242-729	220k $\Omega$
R119, 219	1-242-657	220 $\Omega$
R120, 220	1-242-681	2.2k $\Omega$
R121, 221	1-242-691	5.6k $\Omega$
R122, 222	1-242-661	330 $\Omega$
R123, 223	1-242-690	5.1k $\Omega$
R124, 224	1-242-692	6.2k $\Omega$
R125, 225	1-221-383	10k $\Omega$ (B) semi-fixed
R126, 226	1-242-681	2.2k $\Omega$
R127, 227	1-242-707	27k $\Omega$
R128, 228	1-242-725	150k $\Omega$
R129, 229	1-242-685	3.3k $\Omega$
R130, 230	1-242-709	33k $\Omega$
R131, 231	1-242-665	470 $\Omega$
R132, 232	1-242-709	33k $\Omega$
R133, 233	1-242-661	330 $\Omega$
R134, 234	1-242-673	1k $\Omega$
R135, 235	1-242-700	13k $\Omega$
R136, 236	1-242-649	100 $\Omega$
R137, 237	1-242-681	2.2k $\Omega$
R138, 238	1-242-673	1k $\Omega$
R139, 239	1-242-697	10k $\Omega$
R140, 240	1-242-733	330k $\Omega$
R141, 241	1-242-697	10k $\Omega$
R142, 242	1-242-733	330k $\Omega$
R143, 243	1-242-697	10k $\Omega$
R144, 244	1-242-733	330k $\Omega$
R145, 245	1-242-697	10k $\Omega$
R146, 246	1-242-733	330k $\Omega$
R147, 247	1-242-633	22 $\Omega$
R148, 248	1-242-633	22 $\Omega$
R149, 249	1-242-633	22 $\Omega$
R150, 250	1-242-633	22 $\Omega$

## PLAYBACK AMP CIRCUIT

## SEMICONDUCTORS

Q301, 351 Q401, 451	transistor	2SC631A
Q302, 352 Q402, 452	transistor	2SC631A
Q303, 403	transistor	2SC634A
Q304, 404	transistor	2SC634A
Q305, 355 Q405, 455	transistor	2SC634A

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
D301, 351 D401, 451	diode	10D-2
D302, 352 D402, 452	diode	10D-2
L301, 401	1-407-298	COIL trap 4.7 mH

## CAPACITORS

C301, 351 C401, 451	1-121-391	1 $\mu$ F	50 V	electrolytic
C302, 352 C402, 452	1-121-410	47 $\mu$ F	25 V	electrolytic
C303, 353 C403, 453	1-121-413	100 $\mu$ F	6.3 V	electrolytic
C304, 354 C404, 454	1-105-661-12	0.001 $\mu$ F	50 V	mylar
C305, 355 C405, 455	1-107-107	10pF	50 V	silvered mica
C306, 356 C406, 456	1-121-403	33 $\mu$ F	16 V	electrolytic
C307, 357 C407, 457	1-121-416	100 $\mu$ F	25 V	electrolytic
C308, 358 C408, 458	1-121-398	10 $\mu$ F	25 V	electrolytic
C309, 359 C409, 459	1-105-675-12	0.015 $\mu$ F	50 V	mylar
C310, 410	1-107-242	390pF	50 V	silvered mica
C311, 411	1-121-391	1 $\mu$ F	50 V	electrolytic
C312, 412	1-121-416	100 $\mu$ F	25 V	electrolytic
C313, 413	1-105-661-12	0.001 $\mu$ F	50 V	mylar
C314, 414	1-121-410	47 $\mu$ F	25 V	electrolytic
C315	1-107-125	56pF	50 V	silvered mica
C316	1-121-409	47 $\mu$ F	16 V	electrolytic
C317, 417	1-121-398	10 $\mu$ F	25 V	electrolytic
C318, 368 C418, 468	1-121-398	10 $\mu$ F	25 V	electrolytic
C319, 419	1-121-410	47 $\mu$ F	25 V	electrolytic

## RESISTORS

All resistors  $\frac{1}{4}$ W, carbon type, unless otherwise specified.

R301, 351 R401, 451	1-242-666	510 $\Omega$
R302, 352 R402, 452	1-242-739	560k $\Omega$
R303, 353 R403, 453	1-242-752	150k $\Omega$
R304, 354 R404, 454	1-242-721	100k $\Omega$

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R305, 355 R405, 455	1-242-647	82 $\Omega$	
R306, 356 R406, 456	1-242-707	27k $\Omega$	
R307, 357 R407, 457	1-242-692	6.2k $\Omega$	
R308, 358 R408, 458	1-242-692	6.2k $\Omega$	
R309, 359 R409, 459	1-242-731	270k $\Omega$	
R310, 360 R410, 460		— discarded —	
R311, 361 R411, 461	1-242-685	3.3k $\Omega$	
R312, 362 R412, 462	1-242-657	220 $\Omega$	
R313, 363 R413, 463	1-221-311	5k $\Omega$ (B)	semi-fixed
R314, 364 R414, 464	1-242-673	1k $\Omega$	
R315, 365 R415, 465	1-221-311	5k $\Omega$ (B)	semi-fixed
R316, 366 R416, 466	1-242-709	33k $\Omega$	
R317, 417	1-242-679	1.8k $\Omega$	
R318, 368 R418, 468	1-242-705	22k $\Omega$	
R319, 369 R419, 469	1-242-707	27k $\Omega$	
R320, 370 R420, 470	1-242-693	6.8 $\Omega$	
R321, 371 R421, 471	1-242-697	10k $\Omega$	
R322, 372 R422, 472	1-242-707	27k $\Omega$	
R323, 373 R423, 473	1-242-685	3.3k $\Omega$	
R324, 374 R424, 474		— discarded —	
R325, 375 R425, 475	1-242-699	12k $\Omega$	
R326, 376 R426, 476		— discarded —	
R327, 377 R427, 477		— discarded —	
R328, 428	1-242-681	2.2k $\Omega$	
R329, 429	1-242-705	22k $\Omega$	
R330, 430	1-242-729	220k $\Omega$	
R331, 431	1-242-705	22k $\Omega$	
R332, 432	1-242-709	33k $\Omega$	
R333, 433	1-242-677	1.5k $\Omega$	
R334, 434	1-242-665	470 $\Omega$	
R335, 435	1-242-707	27k $\Omega$	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R336, 436	1-242-677	1.5k $\Omega$
R337, 437	1-242-663	390 $\Omega$
R338, 438	1-242-657	220 $\Omega$
R339, 439		— discarded —
R340, 440	1-242-721	100k $\Omega$

## BIAS OSC CIRCUIT

## SEMICONDUCTORS

Q501	transistor	2SC634A
Q502	transistor	2SC634A
Q503	transistor	2SC634A
D501	diode	10D-2

## COILS

L501	1-231-069	equalizer	1.8 mH
L502	1-231-069	equalizer	1.8 mH
L503	1-409-038	dummy	1 mH
L504	1-409-038	dummy	1 mH

## MICROINDUCTORS

L505	1-407-198	2.2 mH
L506	1-407-198	2.2 mH

## TRANSFORMER

T501	1-433-145	bias osc.
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## CAPACITORS

C501	1-107-188	620pF	500V	silvered mica
C502	1-107-188	620pF	500V	silvered mica
C503	1-121-416	100 $\mu$ F	25V	electrolytic
C504	1-121-404	33 $\mu$ F	25V	electrolytic
C505		— discarded —		
C506	1-121-391	1 $\mu$ F	50V	electrolytic
C507	1-107-188	620pF	500V	silvered mica
C508	1-107-188	620pF	500V	silvered mica
C509	1-105-663-12	0.0015 $\mu$ F	50V	mylar
C510	1-109-508	3,900pF	500V	dipped mica
C511	1-141-076	30~200pF		trimmer
C512	1-141-076	30~200pF		trimmer
C513	1-107-181	330pF	500V	silvered mica
C514	1-107-181	330pF	500V	silvered mica
C515	1-107-188	620pF	500V	silvered mica
C516	1-107-188	620pF	500V	silvered mica

## RESISTORS

R501	1-242-649	100 $\Omega$	¼ W	carbon
R502	1-242-693	6.8k $\Omega$	¼ W	carbon
R503	1-242-625	10 $\Omega$	¼ W	carbon
R504	1-242-625	10 $\Omega$	¼ W	carbon
R505	1-242-625	10 $\Omega$	¼ W	carbon

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R506	1-242-725	150k $\Omega$	¼W carbon
R507	1-242-725	150k $\Omega$	¼W carbon
R508	1-242-667	560 $\Omega$	¼W carbon

#### MISCELLANEOUS

RY501	1-515-127	relay, 650 $\Omega$ 24V	
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### HEADPHONE AMP CIRCUIT

#### SEMICONDUCTORS

Q601, 602	transistor	2SC634A
D601, 602	diode	1T22
D611, 612	diode	1T22

#### TRANSFORMERS

T601, 611	1-427-284	headphone
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#### CAPACITORS

C601, 611	1-121-442	1 $\mu$ F	50V electrolytic
C602, 612	1-121-472	10 $\mu$ F	25V electrolytic
C603, 613	1-121-472	10 $\mu$ F	25V electrolytic
C604, 614	1-121-396	4.7 $\mu$ F	50V electrolytic
C605, 615	1-121-442	1 $\mu$ F	50V electrolytic

#### RESISTORS

R601, 611	1-242-681	2.2k $\Omega$	¼W carbon
R602, 612	1-242-697	10k $\Omega$	¼W carbon
R603, 613	1-242-697	10k $\Omega$	¼W carbon
R604, 614	1-242-721	100k $\Omega$	¼W carbon
R605, 615	1-242-737	470k $\Omega$	¼W carbon
R606, 616	1-242-723	120k $\Omega$	¼W carbon
R607, 617	1-242-681	2.2k $\Omega$	¼W carbon
R608, 618	1-221-997	2.2k $\Omega$ (B)	semi-fixed

### RECORD MODE & SPEED SWITCH CIRCUIT

#### SEMICONDUCTORS

D701	diode	10D-2
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#### CAPACITORS

C701	1-109-501	910pF	500V dipped mica
C702	1-105-689-12	0.22 $\mu$ F	50V mylar
C703	1-105-689-12	0.22 $\mu$ F	50V mylar

#### RESISTORS

R713	1-242-673	1k $\Omega$	¼W carbon
R714	1-242-673	1k $\Omega$	¼W carbon
R715	1-242-673	1k $\Omega$	¼W carbon

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>SWITCHES</b>		
S701	1-514-482	1-key, TAPE SPEED
S702, 703	1-514-728	2-key, REC MODE

### AMP CHASSIS CIRCUIT

#### RESISTORS

R701	1-242-691	5.6k $\Omega$	¼W carbon
R702	1-242-691	5.6k $\Omega$	¼W carbon
R703, 704	1-222-369	20k $\Omega$ (A)	variable (MIC)
R705, 706	1-222-369	20k $\Omega$ (A)	variable (LINE INPUT)
R707, 708		— described in resistor terminal circuit board unit —	
R709	1-242-691	5.6k $\Omega$	¼W carbon
R710	1-242-691	5.6k $\Omega$	¼W carbon
R711, 712	1-222-313	50k $\Omega$ (B)	variable (SOS & ECHO)
R716	1-242-684	3k $\Omega$	¼W carbon
R717	1-242-684	3k $\Omega$	¼W carbon
R718, 719	1-222-314	20k $\Omega$ (B)	variable (PB)

#### JACKS

J703	1-507-142	phono, LINE INPUT (L-CH)
J704	1-507-142	phono, LINE INPUT (R-CH)
J705	1-509-029	DIN CONNECTOR, REC/PB
J706	1-507-142	phono, LINE OUTPUT (L-CH)
J707	1-507-142	phono, LINE OUTPUT (R-CH)
J708	1-507-282	binaural, HEADPHONE
J709		— discarded —
J710		— discarded —
J711	1-507-281	miniature, MIC (L-CH)
J721	1-507-281	miniature, MIC (R-CH)

#### CONNECTORS

CN701~705	1-507-300	22P, printed circuit board
CN706	1-508-400	3P, nylon
CN707	1-539-437-11	22P, docking; printed circuit board
CN708	1-508-421	9P, nylon (male)

#### SWITCHES

S704	1-514-324	slide, TAPE SELECTOR
S705		— discarded —
S706	1-514-692	lever, MONITOR
S707	1-514-692	lever, MONITOR

#### METERS

ME701	1-524-067	VU
ME702	1-524-067	VU

#### MISCELLANEOUS

TM701	1-536-179	terminal strip, 1-L-1
	1-508-411	terminal, pin (male)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>LAMPS</b>			<b>RESISTORS</b>		
PL701		L-CH VU meter – built in VU meter –	All resistors are ¼W, carbon type, unless otherwise specified.		
PL702		L-CH REC	R001	1-242-697	10kΩ
PL703		R-CH VU meter – built in VU meter –	R002	1-203-894	3.3kΩ
PL704		R-CH REC	R003	1-242-721	100kΩ
<b>RESISTOR TERMINAL CIRCUIT</b>			R004	1-242-691	5.6kΩ
<b>RESISTORS</b>			R005	1-242-705	22kΩ
R707	1-242-721	100kΩ ¼W carbon	R006	1-242-705	22kΩ
R708	1-242-721	100kΩ ¼W carbon	R007	1-242-709	33kΩ
<b>ECHO &amp; SOS CIRCUIT</b>			R008	1-242-685	3.3kΩ
<b>CAPACITORS</b>			R009	1-242-697	10kΩ
C801	1-105-673-12	0.01μF 50V mylar	R010	1-242-693	6.8kΩ
C802	1-103-863	330pF 50V polystyrol	R011	1-242-673	1kΩ
C803	1-103-863	330pF 50V polystyrol	R012	1-242-673	1kΩ
C804	1-105-673-12	0.01μF 50V mylar	R013	1-242-705	22kΩ
<b>RESISTORS</b>			R014	1-242-705	22kΩ
R801	1-242-715	56kΩ ¼W carbon	R015	1-244-715	56kΩ
R802	1-242-723	120kΩ ¼W carbon	R016		– discarded –
R803		– discarded –	R017	1-242-715	56kΩ
R804	1-242-715	56kΩ ¼W carbon	R018		– discarded –
R805	1-242-723	120kΩ ¼W carbon	R019	1-244-697	10kΩ
<b>SWITCH</b>			R020	1-244-697	10kΩ
S705	1-514-693	3 position lever, SOS/OFF/ECHO	R021	1-244-697	10kΩ
<b>SYSTEM CONTROL (1) CIRCUIT</b>			R022	1-242-715	56kΩ
<b>SEMICONDUCTORS</b>			R023	1-242-705	22kΩ
Q001~014	transistor	2SC634	R024	1-242-681	2.2kΩ
Q015~018	transistor	2SC756	R025	1-242-705	22kΩ
D001~039	diode	1T22 (A)	R026	1-244-697	10kΩ
<b>CAPACITORS</b>			R027	1-244-697	10kΩ
C001	1-121-398	10μF 25V electrolytic	R028	1-242-715	56kΩ
C002		– discarded –	R029	1-242-705	22kΩ
C003	1-105-673-12	0.01μF 50V mylar	R030	1-242-681	2.2kΩ
C004	1-105-673-12	0.01μF 50V mylar	R031	1-242-705	22kΩ
C005	1-121-398	10μF 25V electrolytic	R032	1-244-697	10kΩ
C006	1-121-416	100μF 25V electrolytic	R033	1-244-697	10kΩ
C007	1-121-416	100μF 25V electrolytic	R034	1-242-705	22kΩ
C008	1-105-671-12	0.0068μF 50V mylar	R035	1-242-705	22kΩ
C009	1-105-671-12	0.0068μF 50V mylar	R036	1-242-681	2.2kΩ
C010	1-105-671-12	0.0068μF 50V mylar	R037	1-242-705	22kΩ
C011	1-121-391	1μF 50V electrolytic	R038	1-242-673	1kΩ
			R039	1-242-705	22kΩ
			R040	1-242-693	6.8kΩ
			R041	1-242-697	10kΩ
			R042	1-242-705	22kΩ
			R043	1-242-689	4.7kΩ
			R044	1-242-697	10kΩ
			R045	1-242-697	10kΩ
			R046	1-242-673	1kΩ
			R047	1-242-673	1kΩ
			R048	1-242-693	6.8kΩ
			R049	1-242-693	6.8kΩ
			R050	1-242-693	6.8kΩ

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R051	1-242-693	6.8k $\Omega$
R052	1-242-705	22k $\Omega$
R053	1-242-705	22k $\Omega$
R054	1-242-693	6.8k $\Omega$
R055	1-242-693	6.8k $\Omega$
R056	1-242-693	6.8k $\Omega$
R057	1-244-693	6.8k $\Omega$
R058	1-242-705	22k $\Omega$
R059	1-242-705	22k $\Omega$
R060	1-242-705	22k $\Omega$
R061	1-242-705	22k $\Omega$
R062		— discarded —
R063	1-244-673	1k $\Omega$
R064	1-244-673	1k $\Omega$
R065	1-242-673	1k $\Omega$
R066		— discarded —
R067	1-242-705	22k $\Omega$
R068	1-242-705	22k $\Omega$

## SYSTEM CONTROL (2) CIRCUIT

## SEMICONDUCTORS

Q1~14	transistor	2SC634
D1~4	diode	10D-2
D5	diode, zener	1S334
D6	diode	10D-2
D7~11	diode	1T22 (A)
D12	diode, zener	1S334
D13	diode	10D-2

## COIL

L1	1-407-212	33mH
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## CAPACITORS

C1	1-105-753-12	0.01 $\mu$ F	200V	mylar
C2	1-105-753-12	0.01 $\mu$ F	200V	mylar
C3	1-121-388	1,000 $\mu$ F	35V	electrolytic
C4	1-121-388	1,000 $\mu$ F	35V	electrolytic
C5	1-121-416	100 $\mu$ F	25V	electrolytic
C6	1-105-673-12	0.01 $\mu$ F	50V	mylar
C7	1-121-388	1,000 $\mu$ F	35V	electrolytic
C8	1-103-791	4,700pF	50V	polystyrol
C9	1-103-791	4,700pF	50V	polystyrol
C10	1-105-677-12	0.022 $\mu$ F	50V	mylar
C11	1-105-689-12	0.22 $\mu$ F	50V	mylar
C12	1-121-398	10 $\mu$ F	25V	electrolytic
C13	1-105-685-12	0.1 $\mu$ F	50V	mylar
C14	1-105-671-12	0.0068 $\mu$ F	50V	mylar
C15	1-107-125	56pF	50V	silvered mica
C16	1-121-398	10 $\mu$ F	25V	electrolytic
C17	1-121-391	1 $\mu$ F	50V	electrolytic

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C18	1-121-416	100 $\mu$ F 25V electrolytic
C19	1-121-398	10 $\mu$ F 25V electrolytic
C20	1-121-398	10 $\mu$ F 25V electrolytic
C21	1-105-683-12	0.068 $\mu$ F 50V mylar
C22	1-121-403	33 $\mu$ F 16V electrolytic
C23	1-121-395	4.7 $\mu$ F 25V electrolytic
C24	1-121-395	4.7 $\mu$ F 25V electrolytic
C25	1-121-404	33 $\mu$ F 25V electrolytic
C26	1-121-398	10 $\mu$ F 25V electrolytic

## RESISTORS

All resistors are  $\frac{1}{4}$ W, carbon type, unless otherwise specified.

R1	1-242-677	1.5k $\Omega$	
R2	1-242-689	4.7k $\Omega$	
R3		— discarded —	
R4	1-242-665	470 $\Omega$	
R5	1-242-689	4.7k $\Omega$	
R6	1-222-804	1k $\Omega$ (B)	semi-fixed
R7	1-242-685	3.3k $\Omega$	
R8	1-242-689	4.7k $\Omega$	
R9	1-242-705	22k $\Omega$	
R10	1-242-685	3.3k $\Omega$	
R11	1-242-705	22k $\Omega$	
R12	1-242-683	2.7k $\Omega$	
R13	1-242-681	2.2k $\Omega$	
R14	1-242-677	1.5k $\Omega$	
R15	1-242-689	4.7k $\Omega$	
R16	1-242-705	22k $\Omega$	
R17	1-242-677	1.5k $\Omega$	
R18	1-242-705	22k $\Omega$	
R19	1-242-705	22k $\Omega$	
R20	1-242-715	56k $\Omega$	
R21	1-242-709	33k $\Omega$	
R22	1-242-705	22k $\Omega$	
R23	1-242-705	22k $\Omega$	
R24	1-242-719	82k $\Omega$	
R25	1-242-725	150k $\Omega$	
R26	1-242-709	33k $\Omega$	
R27	1-242-699	12k $\Omega$	
R28	1-242-683	2.7k $\Omega$	
R29	1-242-683	2.7k $\Omega$	
R30	1-242-685	3.3k $\Omega$	
R31	1-242-681	2.2k $\Omega$	
R32	1-242-697	10k $\Omega$	
R33	1-242-691	5.6k $\Omega$	
R34	1-242-705	22k $\Omega$	
R35	1-242-681	2.2k $\Omega$	
R36	1-242-715	56k $\Omega$	
R37	1-242-705	22k $\Omega$	
R38	1-242-691	5.6k $\Omega$	
R39	1-242-705	22k $\Omega$	
R40	1-242-697	10k $\Omega$	



<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R41	1-242-721	100k $\Omega$	
R42	1-242-721	100k $\Omega$	
R43	1-242-721	100k $\Omega$	
R44	1-242-673	1k $\Omega$	
R45	1-242-697	10k $\Omega$	
R46	1-257-825	10 $\Omega$	$\frac{1}{2}$ W
R47	1-242-691	5.6k $\Omega$	
R48	1-242-697	10k $\Omega$	
R49	1-242-693	6.8k $\Omega$	
R50	1-242-705	22k $\Omega$	
R51	1-242-697	10k $\Omega$	
R52	1-242-691	5.6k $\Omega$	
R53	1-242-691	5.6k $\Omega$	
R54	1-242-673	1k $\Omega$	
R55	1-242-709	33k $\Omega$	
R56	1-242-705	22k $\Omega$	

### SYSTEM CONTROL (3) CIRCUIT

#### SEMICONDUCTORS

D81~85 diode 10D-2

#### RELAYS

RY81	1-515-127	REW,	680 $\Omega$	29.5 mA	DC24V
RY82	1-515-127	F.F.,	680 $\Omega$	29.5 mA	DC24V
RY83	1-515-127	PLAY,	680 $\Omega$	29.5 mA	DC24V
RY84	1-515-127	REV,	680 $\Omega$	29.5 mA	DC24V
RY85	1-515-127	SPEED,	680 $\Omega$	29.5 mA	DC24V

#### ENCAPSULATED COMPONENTS

CP81~88 1-101-534 0.1 $\mu$ F + 120 $\Omega$  500V

#### CONNECTORS

CN81	1-508-417-21	12P (red)
CN82	1-508-418-21	9P (red)

#### MISCELLANEOUS

1-535-041 pin terminal

### MECHA CHASSIS CIRCUIT

#### SEMICONDUCTORS

Q801	transistor	2SD28
Q802	transistor	2SD28
Q803	transistor	2SD28
D801	diode	10D-2
D802	diode	10D-2
D803	diode	10D-2

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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#### TRANSFORMER

T801 1-441-650 power

#### CAPACITORS

C801	1-117-040	2 $\mu$ F + 0.5 $\mu$ F	300V, MP
C802	1-117-054	0.5 $\mu$ F	350V, MP
C803	1-117-054	0.5 $\mu$ F	350V, MP
C804	1-117-082	4 $\mu$ F	250V, MP
C805	1-117-082	4 $\mu$ F	250V, MP

#### WIRE WOUND RESISTORS

R801	1-205-447	50 $\Omega$	25W
R802	1-205-503	68 $\Omega$	40W
R803	1-207-273	5.1 $\Omega$	1.5W
R804	1-207-273	5.1 $\Omega$	1.5W

#### CONNECTORS

CN801	1-509-341	POWER OUTPUT, UNSWITCHED
CN802	1-509-062	POWER SUPPLY
CN803	1-507-300	22P, system control circuit board (1)
CN804	1-507-300	22P, system control circuit board (2)
CN805	1-507-300	22P, system control circuit board (3)
CN806		— included in mechanical parts —
CN807	1-507-301	18P, head assembly
CN808	1-507-307	14P
CN809	1-509-371	3P
CN810	1-509-377	9P, DOCKING, (white)
CN811	1-509-379	12P, POWER SUPPLY, (red)
CN812	1-509-381	9P, CAPSTAN MOTOR, (red)
CN813	1-507-255	11P (socket), REMOTE CONTROL
CN814	1-506-180	dummy plug, REMOTE CONTROL

#### SWITCHES

S801	1-514-057	micro, REC
S802	1-514-057	micro, REVERSE FF
S803	1-514-057	micro, REWIND
S804	1-514-057	micro, STOP
S805	1-514-057	micro, PLAY
S806	1-514-057	micro, FORWARD FF
S807	1-514-057	micro, APS
S808	1-514-693	3-position, lever; AUTO REV
S809	1-514-531-12	POWER FREQUENCY
S810	1-514-531-12	POWER
S811	1-509-064	VOLTAGE SELECTOR
S812	1-514-530	micro, AUTO SHUT-OFF

#### ENCAPSULATED COMPONENTS

CP801	1-101-534	0.1 $\mu$ F + 120 $\Omega$	500V
CP802	1-101-534	0.1 $\mu$ F + 120 $\Omega$	500V

#### SOLENOIDS

PM801	1-454-052	pinch roller
PM802	1-454-053	brake

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>MOTORS</b>		
M801	8-836-624-09	reel; induction; left (UC-624K1)
M802	8-831-634-15	capstan; synchronous (HC-634D6)
M803	8-836-624-07	reel; induction; right (UC-624K)

<b>SOCKETS</b>		
PLB1	1-517-018	lamp
PLB2	1-517-018	lamp
PLB3	1-517-018	lamp
PLB4	1-517-018	lamp
PLB5	1-517-018	lamp

<b>LAMPS</b>		
PL801	1-518-053-11	RECORD
PL802	1-518-053-11	REWIND
PL803	1-518-053-11	REVERSE PLAY
PL804	1-518-053-11	FORWARD PLAY
PL805	1-518-053-11	FF
PL806	1-518-053-11	APS

<b>TERMINAL STRIP</b>		
TM801	1-536-151	2-L-2
TM802	1-536-213	5P
TM803	1-536-179	1-L-1, C type

<b>MISCELLANEOUS</b>		
F	1-533-048	holder, fuse
	1-532-100	fuse, 2A
	1-509-372	pin terminal
	3-140-900	cord, ribbon

**HEAD DECK UNIT**

<b>HEADS</b>		
PBH1	8-829-142-20	playback (PP102-4202)
PBH2	8-829-142-20	playback (PP102-4202)
REC-H	8-824-629-20	record (RP102-2902)
ERASE-H	8-826-629-25	erase (EF18-2902A1)
S-H	1-459-051	sensing

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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**APS CIRCUIT**

<b>SEMICONDUCTORS</b>		
Q905~910	transistor	2SC634A
D902	diode	10D-2
D903	diode	10D-2
D904	diode	10D-2
D905	diode	1T22 (A)
D906	diode, zener	1S334
D907	diode	10D-2
D908	diode	10D-2
D909	diode	1T22 (A)
D910	diode	10D-2
D911	diode	10D-2

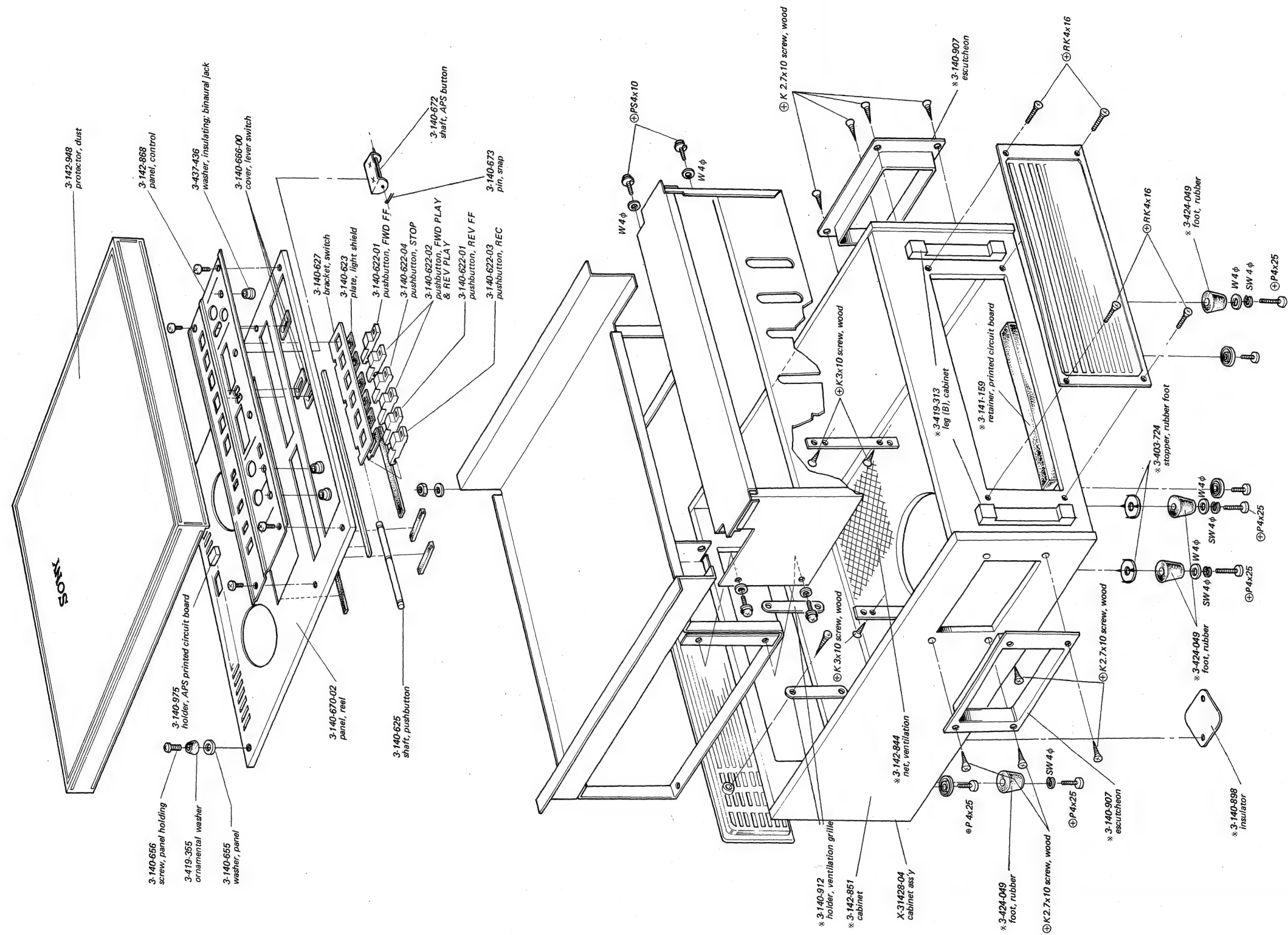
<b>CAPACITORS</b>		
C908	1-121-286	33 $\mu$ F 25 V electrolytic
C909	1-121-286	33 $\mu$ F 25 V electrolytic

<b>RESISTORS</b>		
All resistors are 1/4W, carbon type, unless otherwise specified.		

R914	1-242-691	5.6k $\Omega$
R915	1-242-709	33k $\Omega$
R916	1-242-705	22k $\Omega$
R917	1-242-691	5.6k $\Omega$
R918	1-242-709	33k $\Omega$
R919	1-242-705	22k $\Omega$
R920	1-242-697	10k $\Omega$
R921	1-242-667	560 $\Omega$
R922	1-242-649	100 $\Omega$
R923	1-242-709	33k $\Omega$
R924	1-242-705	22k $\Omega$
R925	1-242-705	22k $\Omega$
R926	1-242-705	22k $\Omega$
R927	1-242-709	33k $\Omega$
R928	1-242-704	20k $\Omega$
R929	1-242-673	1k $\Omega$
R930	1-242-697	10k $\Omega$
R931	1-242-709	33k $\Omega$
R932	1-242-697	10k $\Omega$
R933	1-242-697	10k $\Omega$
R934	1-242-709	33k $\Omega$

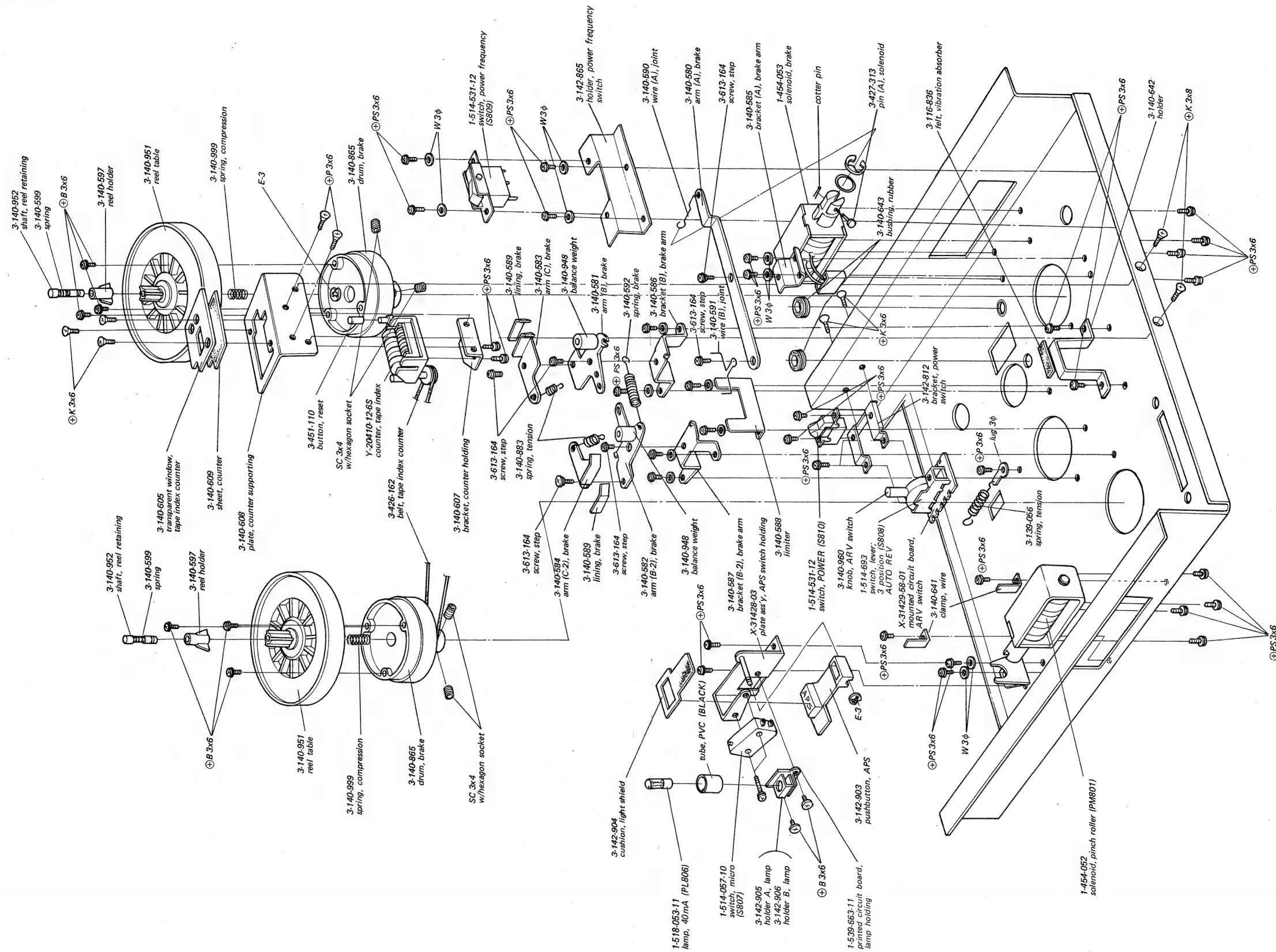
## 8. EXPLODED VIEWS

8-1. Cabinet — top view —

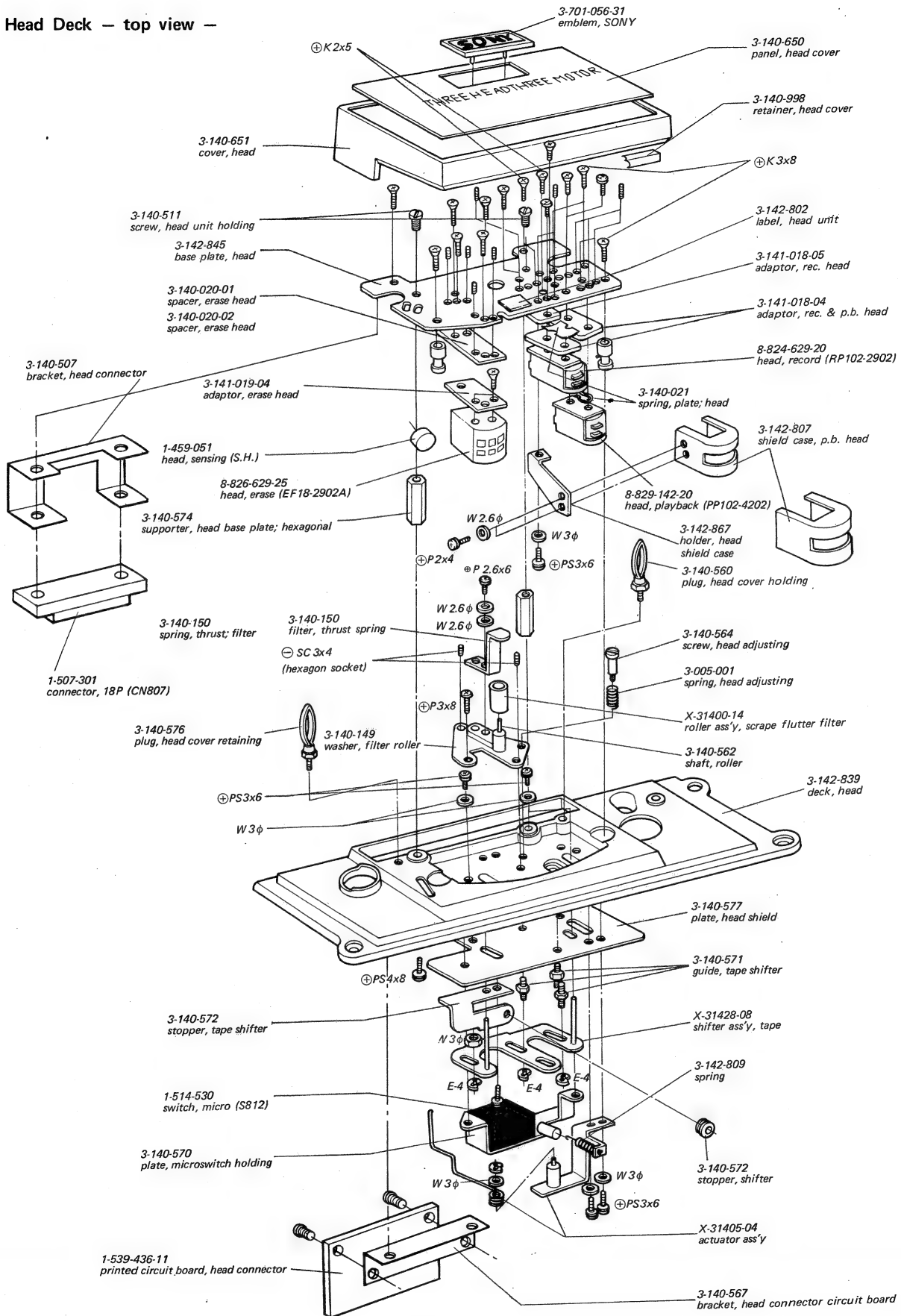


Parts marked with ✖ are included in cabinet ass'y (X-31428-04).

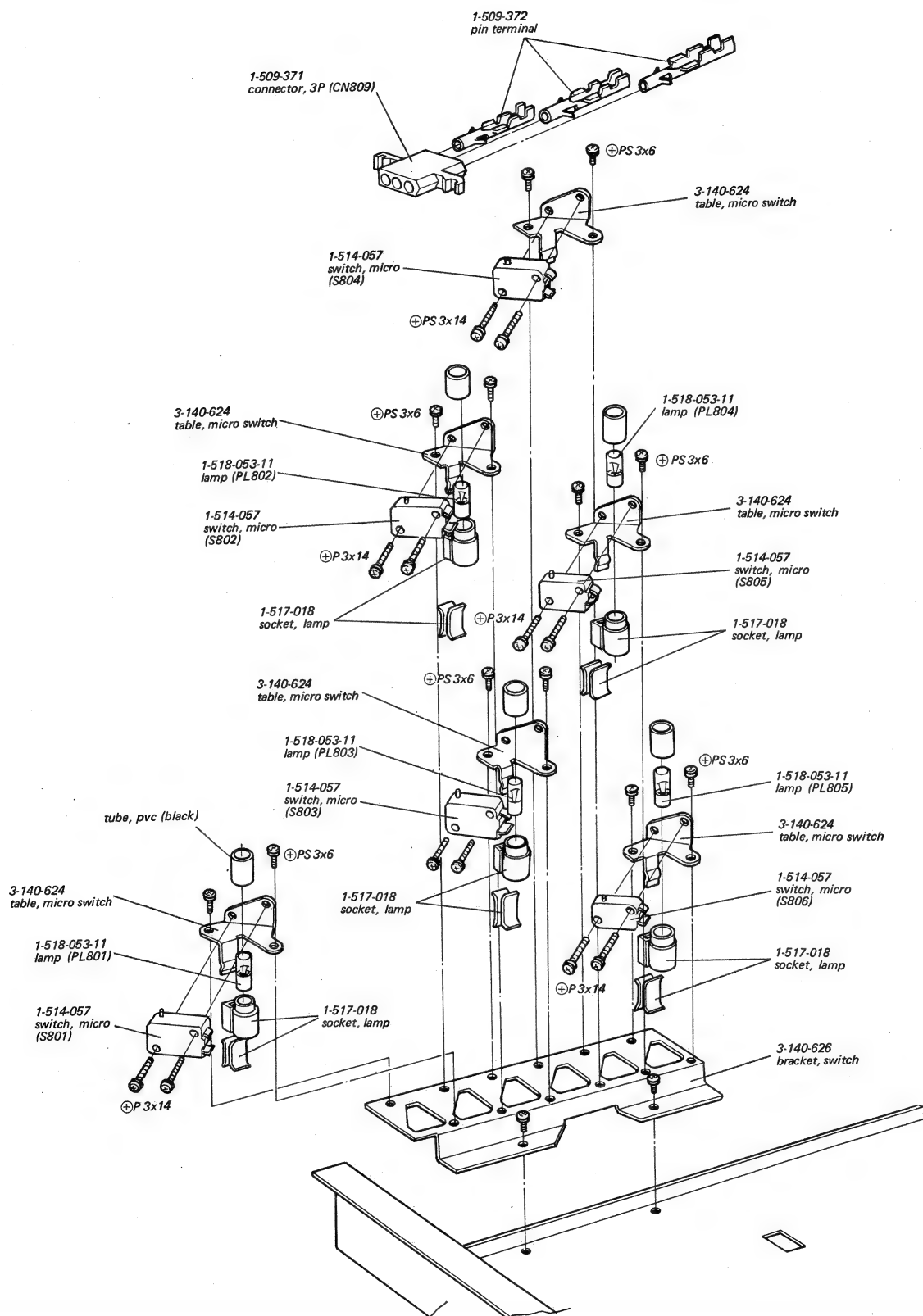
### 8-2. Chassis — top view —



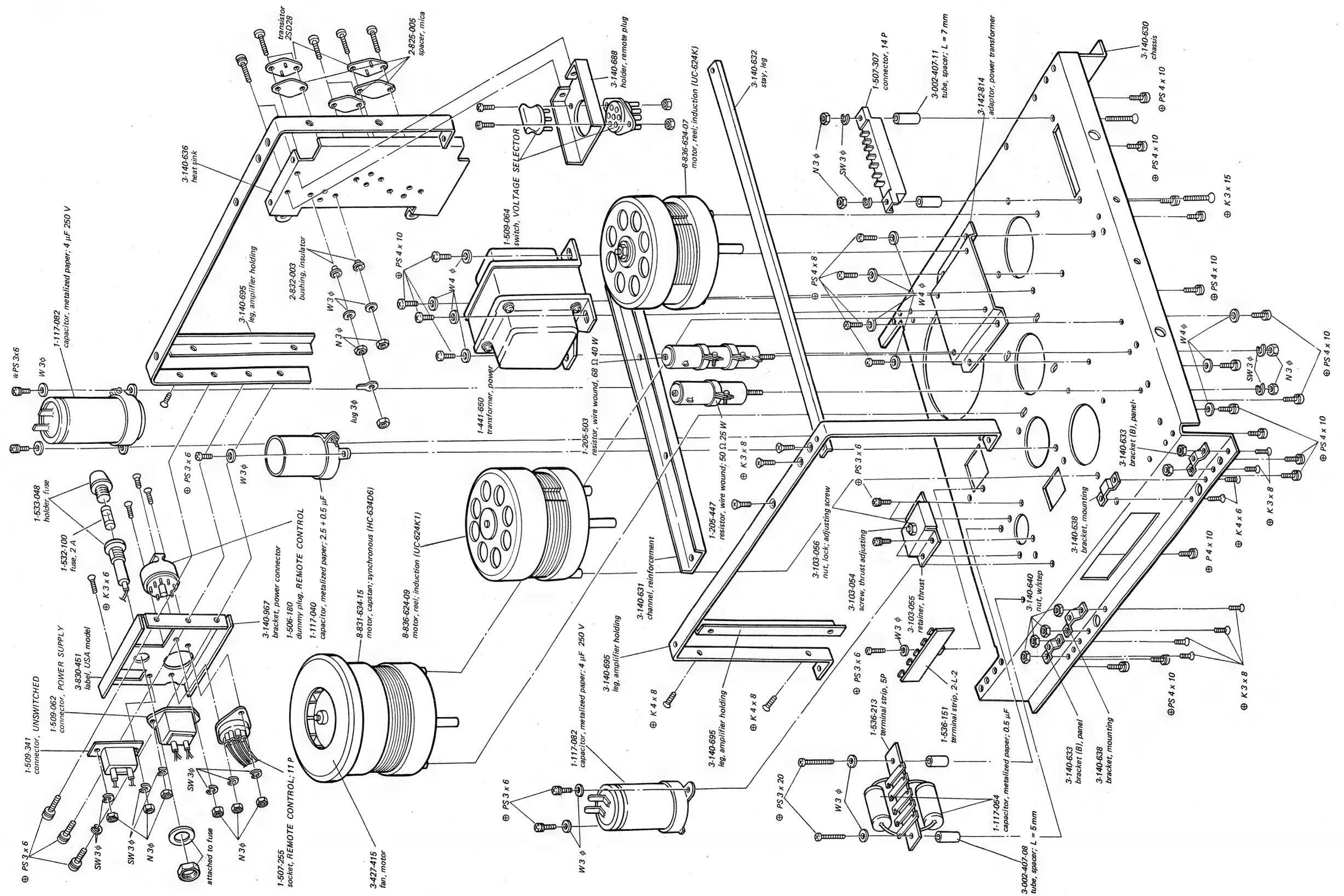
### 8-3. Head Deck — top view —



# 8-4. Microswitches View

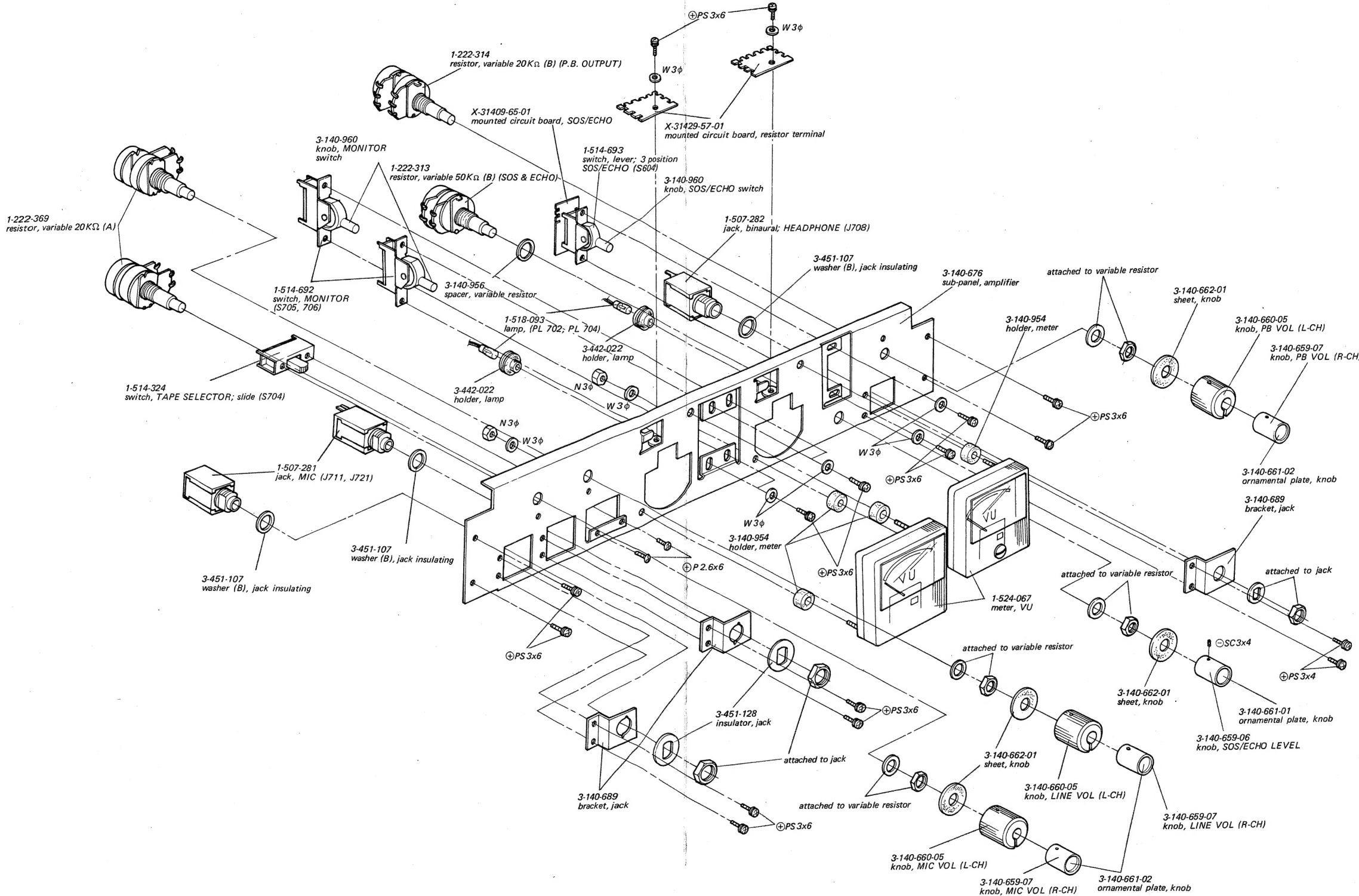


### 8-5. Chassis — bottom view —



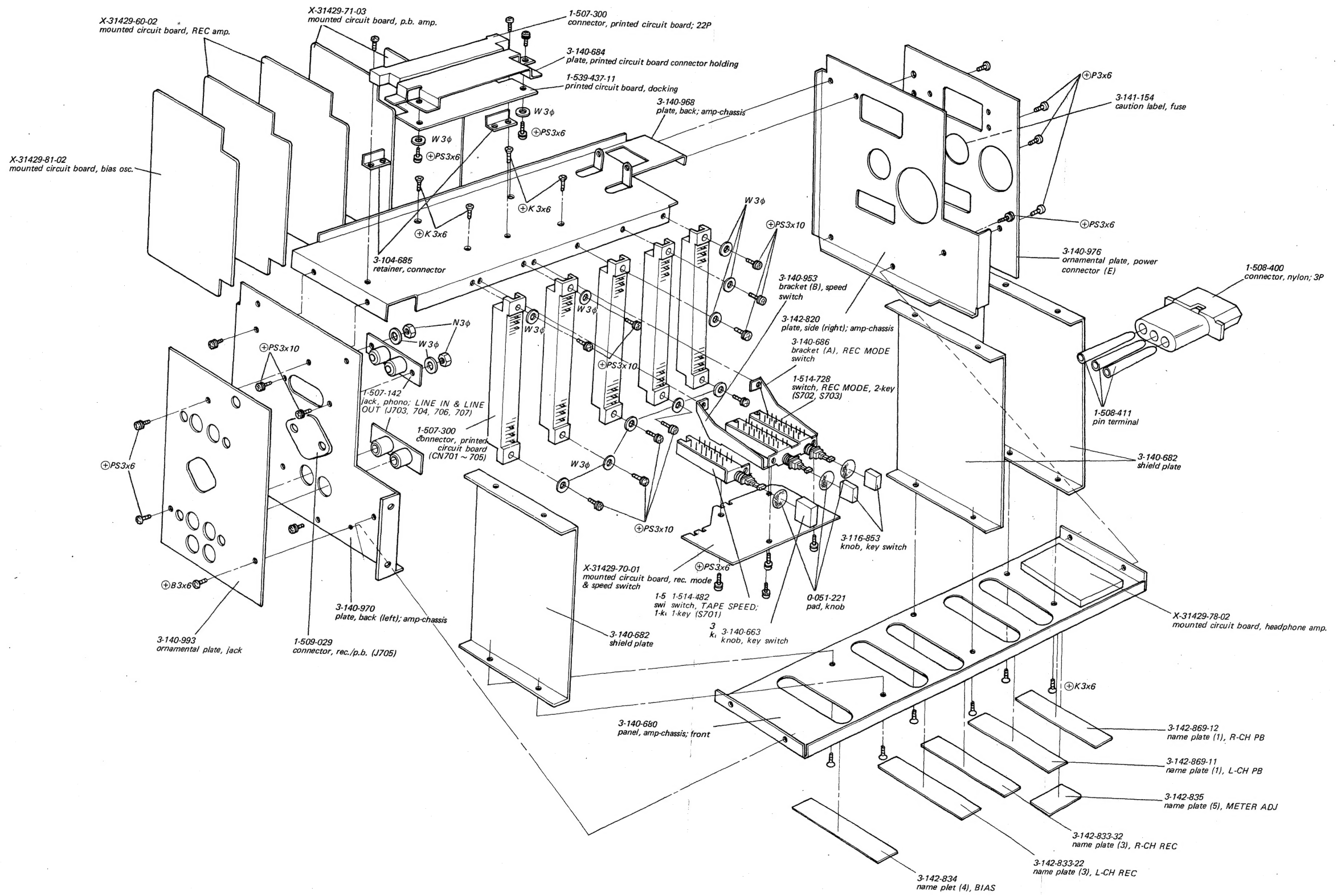


**8-6. Amp. Sub-Panel – top view –**

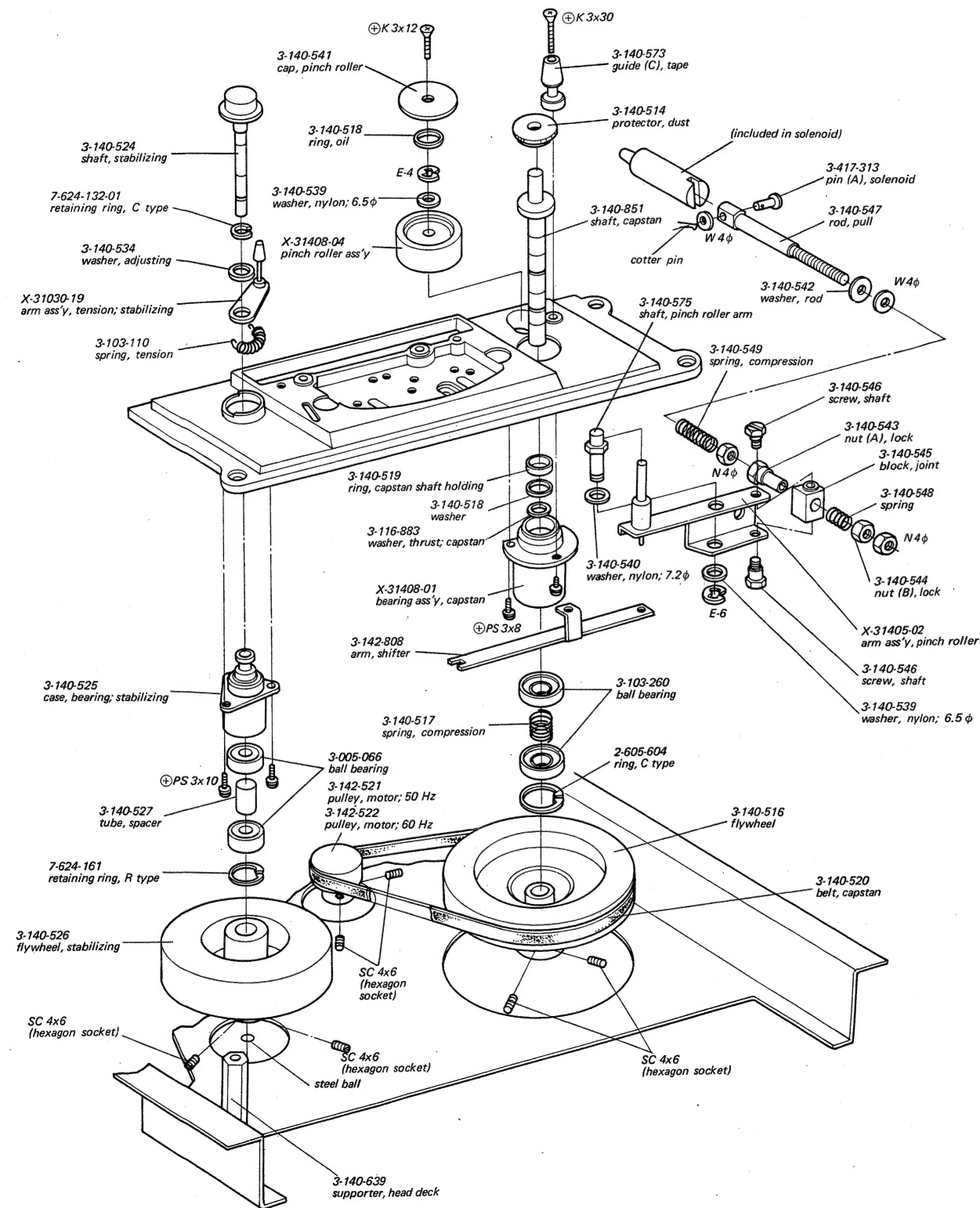




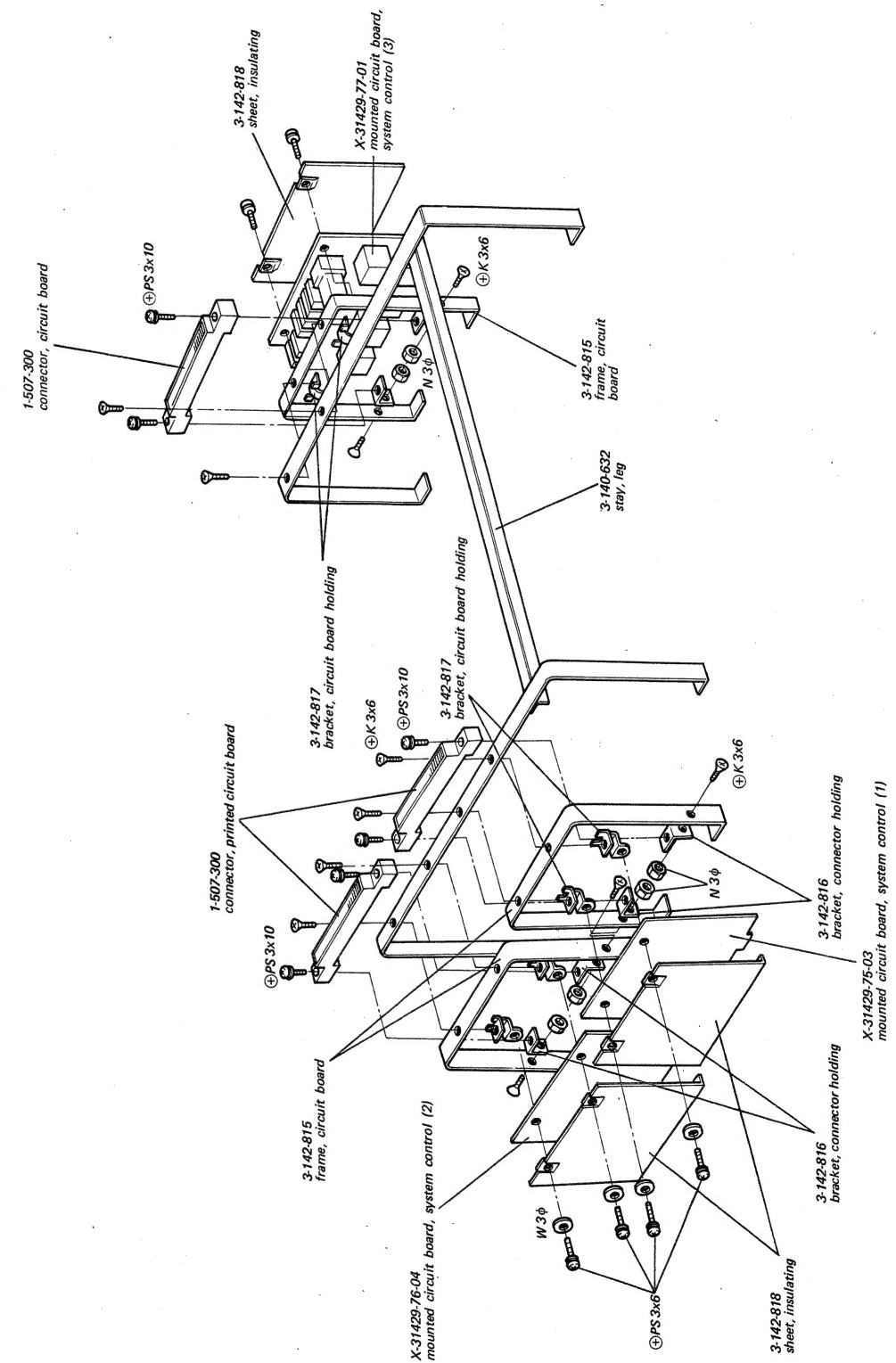
8-7. Amp. Chassis Panel — top view —



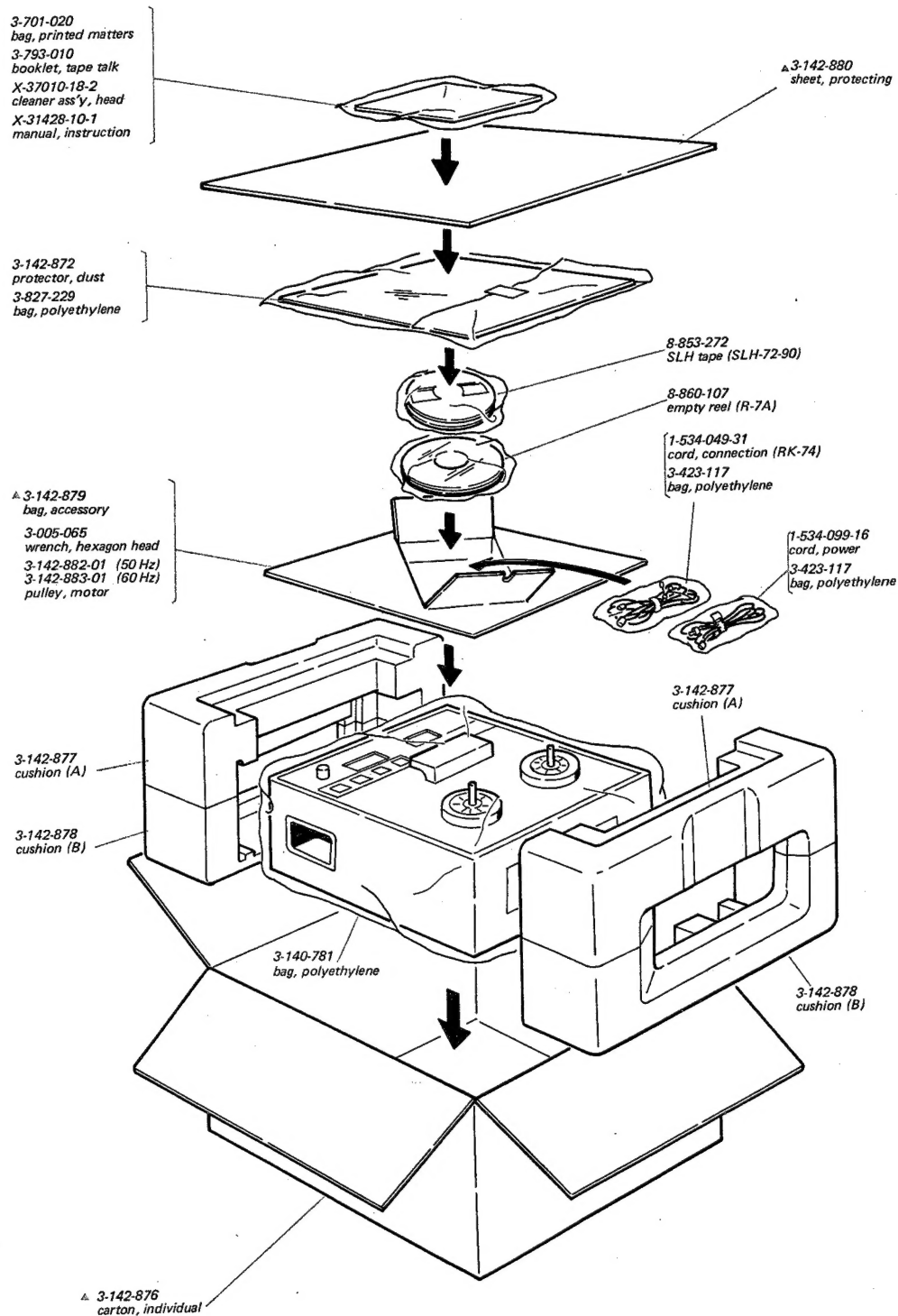
8-8. Flywheel – top view –



### 8-9. System Control Circuit Boards View



## 8-10. Packing



Parts marked with ▲ are included in carton ass'y (X-31428-15).